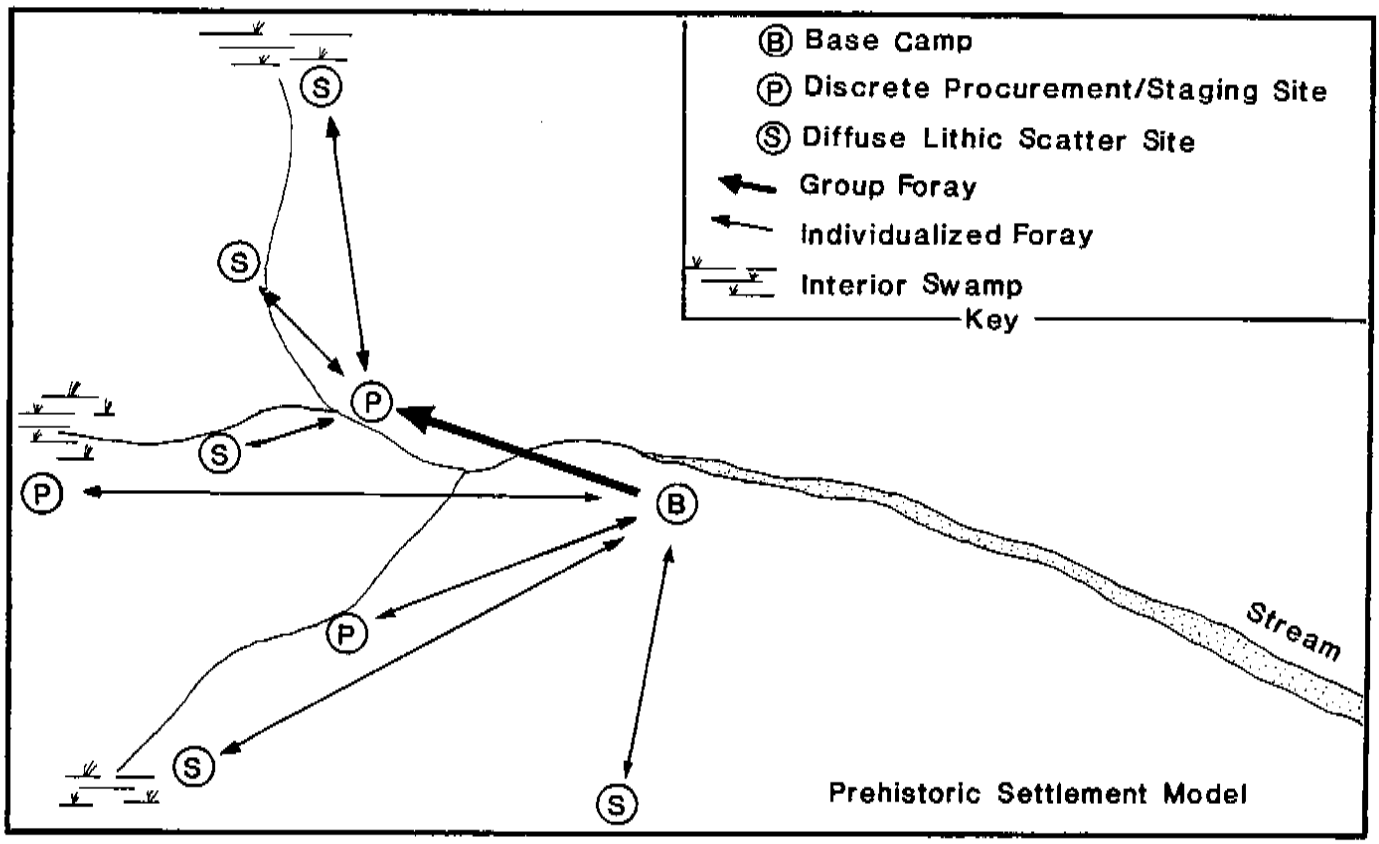
Phase I Archaeological Survey of the Chesapeake and Delaware Canal Section, Odessa Segment, of the U.S. Route 13 Corridor, New Castle County, Delaware



by

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Department of Anthropology
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Delaware Department of Transportation Archaeological Series No. 73

Delaware Department of Transportation

John T. Davis
DIRECTOR
Division of Highways

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U.S. Department of Transportation
Federal Highway Administration

PHASE I ARCHAEOLOGICAL SURVEY

OF THE CHESAPEAKE AND DELAWARE CANAL SECTION, ODESSA SEGMENT, OF THE U.S. ROUTE 13 CORRIDOR, NEW CASTLE COUNTY, DELAWARE

DELDOT PROJECT 85-063-07 DELDOT ARCHAEOLOGY SERIES NO. 73

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ABSTRACT

A Phase I cultural resource survey of the Chesapeake and Delaware Canal section, Odessa Segment, of the U.S. Route 13 Relief Route, which covers approximately 6.4 miles of proposed right-of-way (ROW), was conducted in May - July of 1988. A total of 12 prehistoric and historic archaeological sites were recorded during the survey. The single historic archaeological site, an early 19th century farmstead, appears to be an expression of changing agricultural practices and economic factors at work in Delaware at that time. Preliminary assessment of the prehistoric sites suggests they are all microband base camps or procurement/processing stations and their excavation could serve to further our understanding of these site types and their role in the settlement pattern in northern Delaware. Phase II survey is recommended for eight of the prehistoric sites identified, and the one previously recorded historic site (N-5053).

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INTRODUCTION

The purpose of this report is to describe the Phase I archaeological survey of the Chesapeake and Delaware Canal (C & D Canal), bridge replacement section, Odessa Segment, of the U.S. 13 Relief Route in New Castle County, Delaware. Figure 1 illustrates the entire 46 mile Proposed Right-of-Way changes from the Dover Air Force Base to Tybouts Corner. A 6.4 mile section of the Proposed Right-of-Way which begins at Scott's Run on the southern end of the section, and extends north to the southern end of relocated Delaware Route 7 at Tybouts Corner, was surveyed during the months of May-July 1988 by the University of Delaware Center for Archaeological Research (UDCAR) for the Delaware Department of Transportation (DelDOT) and the Federal Highway Administration (FHWA) for compliance under section 106 of the National Historic Preservation Act. The section of the Proposed Right-of-Way contained within the project limits north of Red Lion Creek was not tested because it is contained within the Tybouts Corner toxic waste dump, a high priority site on the Federal Superfund cleanup list. A portion of the Proposed Right-of-Way was realigned and surveyed after the original survey was conducted. The purpose of this survey was to locate and identify archaeological sites which would be affected by the Proposed Relief Route. At the conclusion of the fieldwork a total of 12 prehistoric and historic site loci had been identified within this 6.4 mile segment of Proposed Right-of-Way and Phase II cultural resource investigations have been recommended for nine of these sites. Figure 2 illustrates the C & D Canal section of the Proposed Right-of-Way with its study parcels, major roads,

FIGURE 1

Proposed U.S. 13 Relief Route, Tybouts Corner to Dover Air Force Base

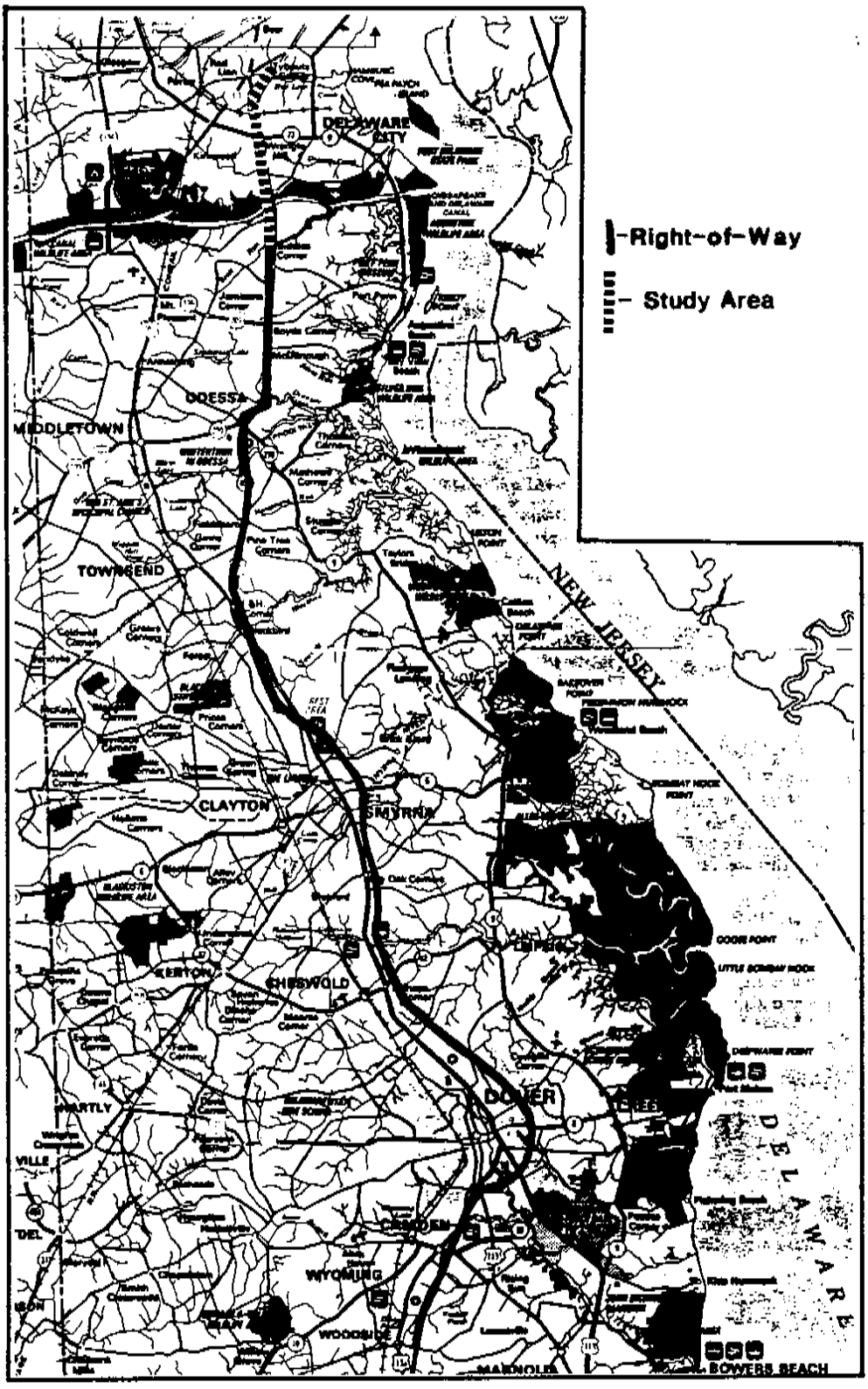
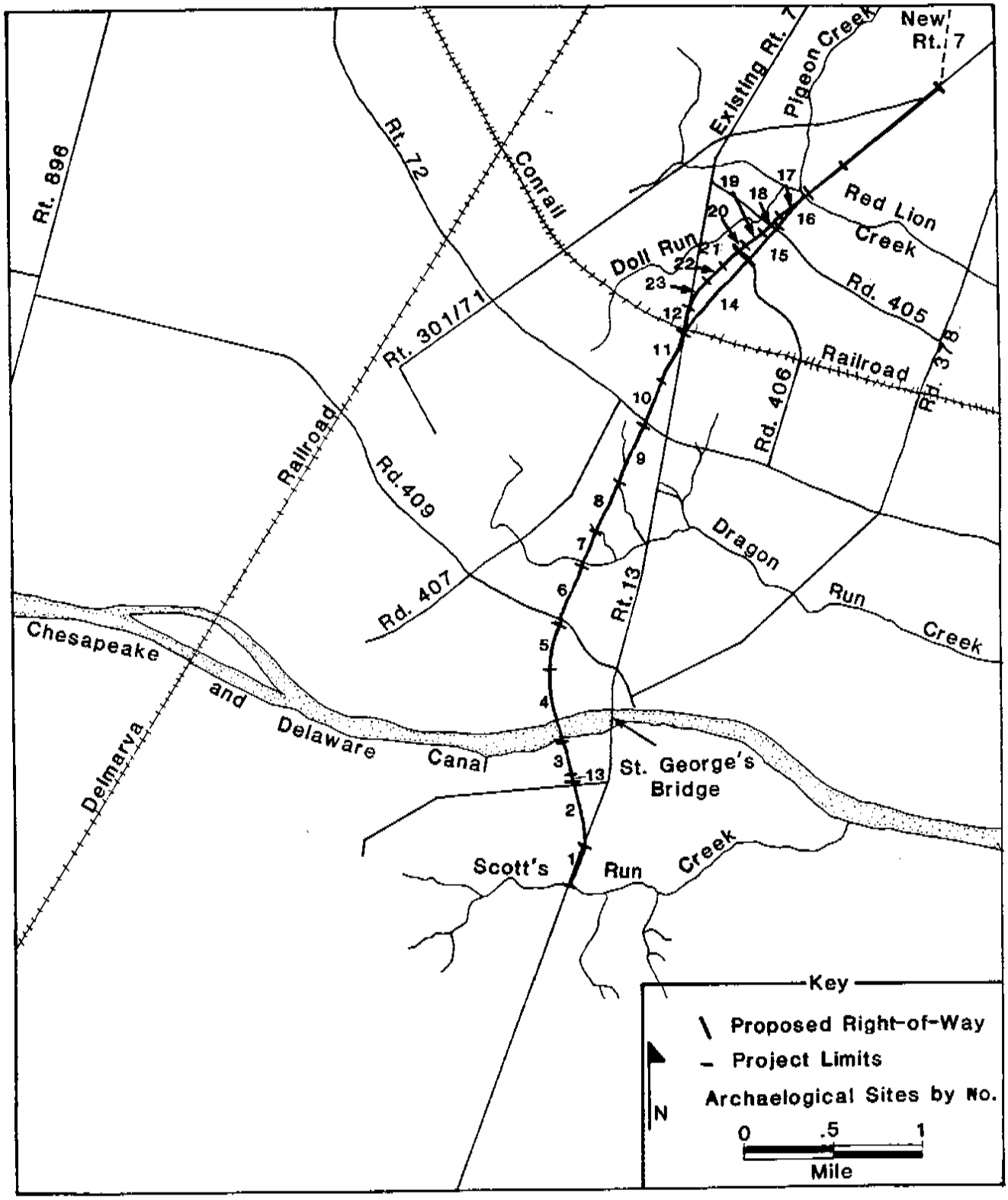


FIGURE 2

U.S. 13 Relief Route, Chesapeake and Delaware Canal Section, Odessa Segment, with Study Parcel Numbers, Major Roads, and Water Courses



and water courses.

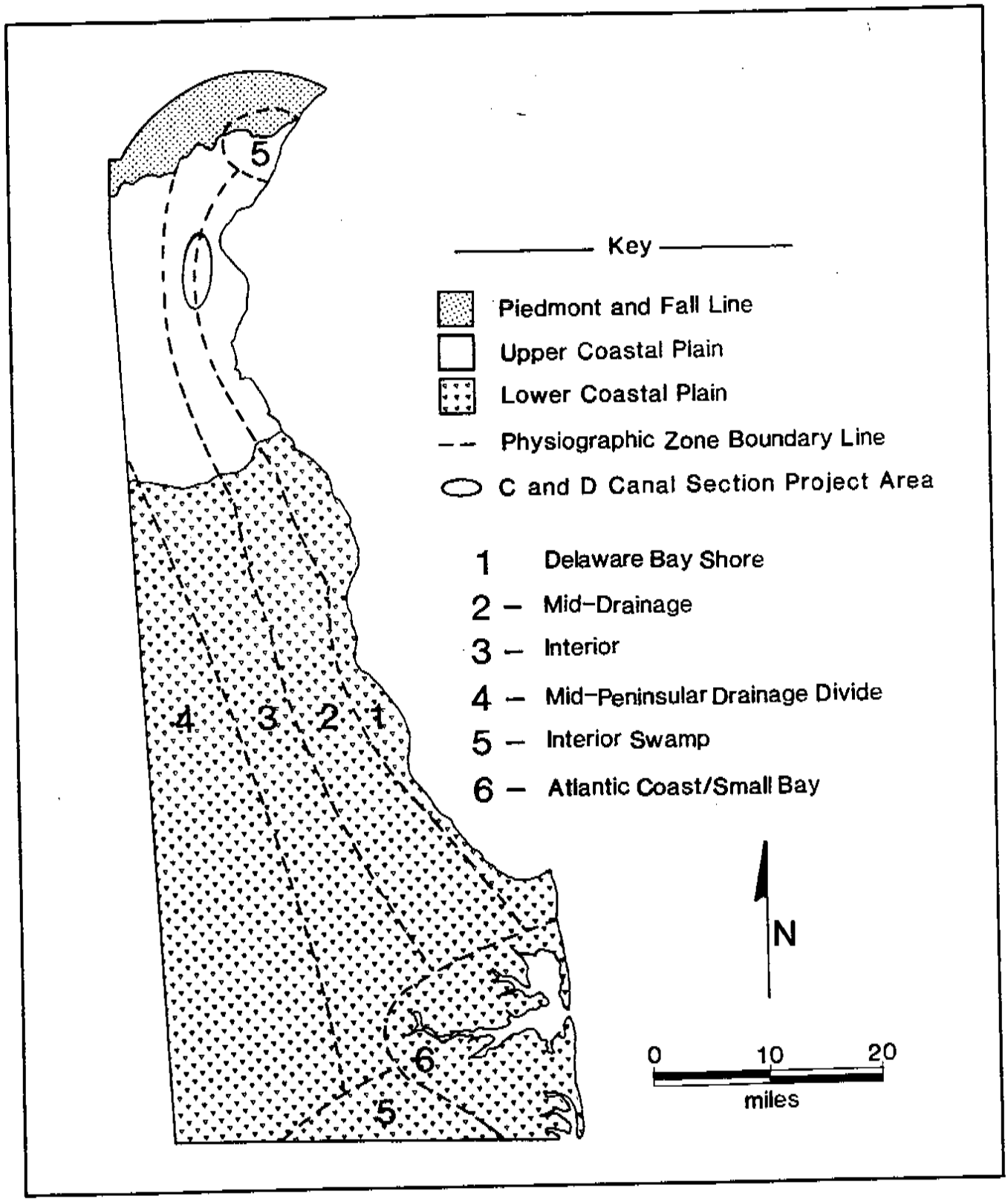
ENVIRONMENTAL SETTING

In order to understand the regional prehistory of the present study it is first necessary to review the region's environments through time. The present study area is located in Delaware's High Coastal Plain. For the study of the prehistoric and historic resources of the region, a number of varied environmental zones are recognized in the High Coastal Plain (Figure 3). Each of these zones is described below and the descriptions are derived from the work of Custer (1984), and abstracted from Custer and Bachman (1986).

High Coastal Plain. Located between the Fall Line and the Smyrna River, the High Coastal Plain represents the southeastern extension of the coarse gravels of the Pleistocene (Columbia) sediments in Delaware (Jordan 1964:40). A rolling topography is present and elevation differences range up to 16 meters (50 feet) from the headlands bordering high order streams and adjacent floodplain marshes. These differences are sufficient to cause differential distributions of plant and animal species (Braun 1967:246-247). Watercourses are deeply incised and are lined by a veneer of relatively recent sediments that is thin along the upper reaches of the drainages and thickens moving toward their mouths (Kraft et al. 1976:13). Most streams are not tidal and the freshwater/saltwater mix allows for a wide range of resources. Soils include a variety of well-drained and poorly drained settings that are distributed in a mosaic pattern across the region.

FIGURE 3

Physiographic Zones



Within the High Coastal Plain there are a number of smaller environmental zones. These additional sources of environmental variability are generally distributed in broad belts parallel to the Delaware River and Bay shore. Each is described below and depicted in Figure 3.

Mid-Peninsular Drainage Divide. Representing the "spine" of the Delmarva Peninsula, this area is defined by the stretch of low, rolling topography that separates the headwaters of streams that drain into the Delaware River from streams that drain into the Chesapeake Bay. Elevation differences are slight and flowing surface water is restricted to the low order headwaters of the larger streams and rivers. Additional water sources of this zone include a number of swamps that have formed in areas of poorly drained soils surrounded by sand ridges. Bay/basin features, known locally as "whale-wallows", represent another water source in this area. Geomorphological evidence indicates that they were formed during the Pleistocene and many seem to have held water, at least seasonally, ever since (Rasmussen 1958:82). The combination of headwater drainages, swampy areas, and bay/basin features with interspersed well-drained areas creates a mosaic of edaphic settings.

Delaware Shore. Included in the Delaware Shore zone are the remnant terraces of the Delaware River as well as the various tidal marshes that fringe the Delaware River and the Delaware Bay. These marshes are found throughout the area and often extend well up the drainages from the river and bay shore. Soils in the area are generally poorly drained; however, pockets of well-drained soils in the areas of higher elevation may be found.

Only the eastern edges of the project area are included in this zone.

Mid-Drainage. The Mid-Drainage zone is located between the Delaware Shore and Mid-Peninsular Drainage Divide zones and includes the majority of the study area. The modern tidal limit along the drainages marks the center of this zone and the major drainages and their tributaries are fresh throughout the inland portion of the zone. Some tidal marshes and poorly drained floodplains are found along the major drainages. Well-drained soils are found on upper terraces of the drainages and on isolated headlands between the major drainages and their tributaries. The extensive combination of brackish and freshwater resources makes this zone one of the richest in Delaware for hunters and gatherers.

It should be noted that locations of these zones have not remained constant since the end of the Pleistocene because some zones have been subjected to extensive landscape modification. The most important factor in this landscape modification is post-Pleistocene sea level rise. Kraft et al. (1976) note that sea level has been rising along the Atlantic Coast for the past 12,000 years and this sea level rise has transformed the Delaware River of 10,000 B.C. into the current drowned estuary. Many old land surfaces have become submerged and the configuration of the Delaware River and Bay have changed dramatically. In terms of the study area, these effects would be most prevalent in the eastern half of the Mid-Drainage zone and the River Shore zone. During the past 4,000 years, the rate of sea level rise has

decreased thus the rate of shoreline degradation has also decreased. Thus the environmental zones discussed above have remained relatively constant for that time period. The important point to make is that the Proposed Right-of-Way lies in an area of overlapping zones which increases its value to prehistoric peoples as a resource procurement area.

The C & D Canal section of the Relief Route is defined by two easterly flowing streams. The southern boundary of the section is Scott's Run Creek which drains into the C & D Canal. The northern boundary of this section is at the southern end on relocated Delaware Route 7 at Tybouts Corner which drains into the Delaware Bay. The Proposed Right-of-Way crosses one other named east-west tributary of the Delaware Bay, Dragon Run Creek. In addition, a smaller named tributary of Red Lion Creek, Doll Run Creek, flows roughly parallel to existing Route 13 from the intersection of Route 7 and Route 13 to Red Lion Creek. Several unnamed tributaries of these streams as well as several ephemeral drainages are also transversed by the Right-of-Way. Swampy and poorly-drained areas are found adjacent to the major streams.

Soils present in the project area are grouped within the Matapeake-Sassafras association (Matthews and Lavoie 1970). Matapeake silt loams are the dominant soil type from the C & D Canal to the southern end of the Project Area. Matapeake silt loams tend to be less dominant in the remainder of the Project Area with Sassafras sandy loams being relatively evenly interspersed. Most of these soils are well drained and badly eroded. Along the stream drainages, some poorly drained soils are present and the interface of the well drained and poorly

drained soils are the most likely locations for prehistoric sites.

MODERN ENVIRONMENTAL SETTING

Land use in the Project Area has remained primarily agricultural since the arrival of the Europeans and the colonization of the region. The majority of the Project Area is still in agricultural use from the intersection of existing Route 7 and Route 13 to the southern end of the Project Area with the exception of the residential development in the St. George's Bridge area. The area west of Route 13, and from the Route 7 and Route 13 intersection to the north end of the Project Area is largely residential. Within this segment, two areas of one parcel have been used for borrow fill, and another parcel is currently being cultivated. East of Route 13 from the above mentioned intersection to the north end of the Project Area, land-use is all agricultural in various stages of use and/or abandonment. Approximately one mile to the east of the Project Area on its northern end lies the sprawling Texaco USA refinery, which has substantially altered the culture history, topography, and general ambience of this section of the county. The Project Area itself has not been as significantly altered by increased development as have adjacent nearby regions and other portions of the Route 13 Relief Route.

REGIONAL PREHISTORY

This summary of the regional prehistory is abstracted from Custer (1984), Custer and Bachman (1986), and Bachman, Grettler,

and Custer (1988). The prehistoric archaeological record of the Delaware Coastal Plain can be divided into four large blocks of time: The Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), the Archaic Period (6500 B.C. - 3000 B.C.), the Woodland I Period (3000 B.C. - A.D. 1000), and the Woodland II Period (A.D. 1000 - A.D. 1650). A fifth time period, the Contact Period, from A.D. 1650 to A.D. 1750, marks the final phase of occupation by Native American groups of Delaware in anything resembling their pre-European Contact form. Each of these periods is described below.

Paleo-Indian Period (12,000 B.C. - 6500 B.C.) - The Paleo-Indian Period encompasses both the final retreat of Pleistocene glacial conditions from Eastern North America and the subsequent establishment of more modern Holocene environments. The distinctive feature of the Paleo-Indian Period is an adaptation to the cold, and alternately wet and dry, conditions at the end of the Pleistocene and the beginning of the Holocene. Paleo-Indians relied on a hunting and gathering adaptation in which animal food resources comprised a major portion of the diet. Hunted animals may have included now-extinct megafauna and moose. A mosaic of deciduous, boreal, and grassland environments would have provided a large number of productive habitats for these game animals in northern Delaware and watering areas would have been particularly good hunting settings.

Tool kits of Paleo-Indian groups were oriented toward the procurement and processing of hunted animal resources. A preference for high quality lithic materials is apparent in the flaked stone tool kits and careful resharpening and maintenance

of tools was common. A mobile lifestyle in which groups focused on game-attractive environments is hypothesized with a social organization consisting of single and multiple family bands. Throughout the 5500 year time span of the period, this basic adaptation remains essentially uniform, although some adjustments occur with the appearance of Holocene conditions in the latter part of the Paleo-Indian Period.

Custer (1986) has summarized the site types and associated settings for the Paleo-Indian Period in Delaware. Quarry, quarry reduction stations, base camps, base camp maintenance stations, outlying hunting sites, and isolated point finds were defined. None of these have been recognized in the Project Area to date. There are no large cobble outcrops located within the Project Area, and thus it is unlikely that quarry reduction stations occur. Since base camps often occur in close proximity to quarries during this time period, this site type is probably absent also. Low stream order and the lack of sites with good southern exposure may be additional negative factors for the formation of base camps. The proximity of the Project Area to the Delaware Chalcedony Complex (Custer, Ward, and Watson 1986) means base camp maintenance stations, outlying hunting sites, and isolated point finds may occur. These most likely would be small sites, measuring just a fraction of a hectare, and would be expected in a variety of upland settings and low terraces adjacent to poorly drained areas. Since there are no known sites from the Project Area representing this time period, any Paleo-Indian site would be of value.

Archaic Period (6500 B.C. - 3000 B.C.) - The Archaic Period is characterized by an adaptation to the newly emerged full Holocene environments of Delaware. These environments differed from earlier ones and were dominated by mesic forests of oak and hemlock. A reduction in open grasslands in the face of warm and wet conditions caused the extinction of many of the grazing animals hunted during Paleo-Indian times; however, browsing species such as deer flourished. Sea level rise is also associated with the beginning of the Holocene in Delaware. The major effect of the sea level rise would have been to raise the local water table, which helped create a number of large interior swamps. Adaptations changed from the hunting focus of the Paleo-Indian Period to a generalized foraging pattern in which plant food resources played a more important role. Large swamp settings apparently supported large base camps, but none are known from the Study Area. A number of small procurement sites in favorable hunting and gathering locals such as bay/basin features are known from Delaware's Coastal Plain.

Tool kits were more generalized than earlier Paleo-Indian tool kits and showed a wider array of plant processing tools such as grinding stones, mortars, and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band level organization which saw the waxing and waning of group size in relation to resource availability is evident. Known sites include large base camps such as the Clyde Farm Site in northern Delaware and smaller processing sites located at a variety of locations and environmental settings. There are no excavated Archaic Period

sites from the state and all of the known sites are represented by surface collections. There are no sites from this period within the Project Area. From sites in surrounding states, Custer (1986) has identified three site types for this period of Delaware prehistory: macro-band base camp, micro-band base camp, and procurement site. The most common site settings for the macro-band base camps are large interior swamps and terraces along major rivers. Neither of these are present in the Project Area and thus this site type is not expected. Micro-band base camps and procurement sites may be present as these sites are known to occur on terraces along lower order streams and in proximity to hunting areas and lithic outcrops. Some of these types of sites may occur along lower order streams like Scott Run, Dragon Creek, St. Georges Creek (drainage now occupied by the C & D Canal), Doll Run, and Red Lion Creek. Since there are no recorded sites from this time period from the Project Area, and there are no excavated sites from the state, any site found during the Phase I survey is likely to be considered significant.

Woodland I Period (3000 B.C. - A.D. 1000) - The Woodland I Period can be correlated with a dramatic change in local climates and environments that seem to be part of events occurring throughout the Middle Atlantic region. A pronounced warm and dry period set in and lasts from ca. 3000 B.C. to 1000 B.C. Mesic forests were replaced by xeric forests of oak and hickory and grasslands again became common. Some interior streams dried up; however, the overall effect of the environmental change is an alteration of the environment, not a degradation. Continued sea level rise and a reduction in its rate also made many areas of

the Delaware River and Bay shore the sites of large brackish water marshes which are especially high in productivity. The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlements include the major river floodplains and estuarine swamp areas. Large base camps with fairly large numbers of people are evident in many settings in the Delaware Coastal Plain, such as the Barker's Landing, Coverdale, Hell Island, and Robbins Farm Sites. These sites seem to have supported many more people that previous base camp sites and may have been occupied on a year-round basis. The overall tendency is toward a more sedentary lifestyle.

Woodland I tool kits show some minor variations as well as some major additions from previous Archaic tool kits. Plant processing tools become increasingly common, indicating intensive harvesting of wild plant foods that may have approached the efficiency of agriculture by the end of the Woodland I Period. Chipped stone tool assemblages changed little from the preceding Archaic Period, save for the introduction of broad-blade, knife-like processing tools. The addition of stone, and then ceramic vessels is also seen. These items enabled more efficient cooking of certain foods and may also have functioned as storage containers for surplus plant foods. Storage pits and house features are also known for Northern Delaware during this period from sites such as Clyde Farm and Delaware Park.

Social organizations also seem to have undergone radical changes during this period. With the onset of relatively sedentary lifestyles and intensified food production, which might

have produced occasional surpluses, incipient ranked societies began to develop as indicated by the presence of 1) extensive trade and exchange in lithic materials for tools as well as non-utilitarian artifacts, 2) caching of special artifact forms, and 3) utilization of artifacts manufactured from exotic raw materials. The data from cemeteries of the Delmarva Adena Complex (ca. 500 B.C. to A.D. 0), such as the Frederica Site and the St. Jones Site (Thomas 1976), indicate that certain individuals had special status in these societies and the existence of a simple ranked social organization is hypothesized. Similar data from the Island Field Site show that these organizations lasted up until A.D. 1000, although they may not have always been present throughout all of the Woodland I Period. In any event, by the end of the Woodland I Period a relatively sedentary lifestyle is evident in Delaware's Coastal Plain. It should also be noted that the greatest number of archaeological sites in the Project Area date to the Woodland I Period and the Mid-Drainage zone is the focus of most of the important sites of this period.

Four Woodland I cultural complexes have been identified for the High Coastal Plain of northern New Castle County (Custer 1984). These four and their approximate date ranges are Clyde Farm (3000 B.C.- 500 B.C.), Wolfe Neck (500 B.C.- A.D. 0), Carey (A.D. 0 - A.D. 600), and Delaware Park (A.D. 600 - A.D. 1000). Clyde Farm Complex macro-band base camps are large sites located in major riverine floodplains, along developing estuarine marshes, and in poorly drained areas in the Piedmont. The

Project Area contains none of these settings and it is unlikely that any large base camps would occur. Micro-band base camps are likely to occur in outlying areas adjacent to specialized resource locations and procurement sites are likely to occur a short distance from these campsites (Custer 1986:85). Other than these general descriptions about site size and location, little specific information is available which would differentiate between the two site types for this time period. A micro-band base camp, 7NC-E-11, lies well east of the Project Area along the north bank of Red Lion Creek and a second micro-band base camp, 7NC-E-2 (Indians Mound Site) is located about one-half mile west of the Project Area near the village of Red Lion. A Clyde Farm procurement site, 7NC-G-1, west of the Snapp property (Parcel 3), has been identified adjacent to the Project Area. Two other Woodland I procurement sites, 7NC-G-19 and 7NC-G-30, which have not been associated with any cultural complex, are located east of the Project Area along the south bank of the C & D Canal (former channel of St. Georges Creek). It is likely that both micro-band base camps and procurement sites occur in the Project Area and since neither one is well defined for this complex, the excavation of either type would be beneficial.

During Wolfe Neck times, there is a decrease in the use of rhyolite and argillite for stone tool manufacture, suggesting there is a decrease in the importance of these materials. The implication is that old trade networks and the concomitant exchange of information are reduced during this period. A Wolfe Neck macro-band base camp site may shed some light upon this problem. Otherwise, Wolfe Neck habitation and procurement sites

and settlement locations appear to be similar to those of the preceding Clyde Farm Complex. No Wolfe Neck Complex sites appear in or adjacent to the Project Area, although there are some poorly known Woodland I sites in nearby drainages which could contain Wolfe Neck components.

The Carey Complex component in northern Delaware has been best expressed at the Clyde Farm Site (7NC-E-6) and at the Delaware Park Site (7NC-E-41). These large macro-band base camps contain storage features (indicating a reliance upon the harvesting of plant foods) and house pits, and the complex is distributed throughout Delaware at this time. A heavy dependence upon fish and shellfish is observed by Custer (1984:131). Carey Complex sites in the Project Area would most likely take the form of micro-band base camps and procurement sites associated with the larger base camps noted above. The Delaware Park Complex is characterized by a similar settlement pattern and adaptation and once again only micro-band base camp and procurement sites would be expected within the Proposed Right-of-Way. There are no Carey or Delaware Park Complex sites within or adjacent to the Proposed Right-of-Way.

Woodland II Period (A.D. 1000 - A.D. 1650) - In many areas of the Middle Atlantic, the Woodland II Period is marked by the appearance of agriculture food production systems; however, in the Delaware Coastal Plain there are no clear indications of such a shift. Some of the settlements of the Woodland I Period, especially the large base camps, were also occupied during the Woodland II Period and very few changes in basic lifestyles and

overall artifact assemblages are evident. Intensive plant utilization and hunting remained the major subsistence activities up to European Contact. There is some evidence, nonetheless, of an increasing reliance on plant foods and coastal resources throughout the Woodland II Period in the Study Area. Social organization changes are evidenced by a collapse of the trade and exchange networks and the end of the appearance of elaborate cemeteries.

Custer (1986) notes that the data quality for the Woodland I period for this area is poor. Only two sites from the period occur near the Project Area: 7NC-E-12 (site function unknown) and 7NC-G-30, a procurement site. Any macroband base camp in the area would likely express a prehistoric utilization of several of the environmental zones discussed above and a microband base camp would be used for a localized resource exploitation activity. The excavation of either of these site types would serve to verify this hypothesis.

Contact Period (A.D. 1650 - A.D. 1750) - The Contact Period is an enigmatic period of the archaeological record of Delaware which begins with the arrival of the first substantial numbers of Europeans in Delaware. The time period is enigmatic because no Native American archaeological sites that clearly date to this period have yet been discovered in Delaware. A number of sites from the Contact Period are known in surrounding areas such as southeastern Pennsylvania, nonetheless. It seems clear that Native American groups of Delaware did not participate in much interaction with Europeans and were under the domination of the Susquehannock Indians of southern Lancaster County,

Pennsylvania. Thus, the discovery of any sites in the project area would be beneficial to our understanding of this period. The Contact Period ends with the virtual extinction of Native American lifeways in the Middle Atlantic area except for a few remnant groups.

REGIONAL HISTORY

This overview is abstracted from Munroe (1978), Hoffecker (1973, 1977), Weslager (1961, 1967), Lemon (1972), Hancock (1932), and Custer and Bachman (1986). A more detailed historical overview of the general Route 13 corridor is provided in the Phase I/II Research Plan (Custer, Bachman, and Grettler 1987). The earliest colonial settlement in Delaware was the Dutch settlement of Zwaanendael which was established as a whaling colony near present-day Lewes in 1629. The settlement was short-lived as the early colonists were massacred by local Indians in 1632. It was not until 1661, when a Mennonite colony was formed that a permanent settlement was established at Lewes. Further north, the Swedes established Fort Christina in 1638 at the confluence of the Brandywine and Christina Rivers in what is now part of Wilmington. The small colony grew and within a few years a fort, church, and small farming community appeared and formed the nucleus for the first permanent European settlement in Delaware. This community contested the earlier Dutch settlements further north in the Delaware Valley.

Dutch colonial interests continued and in 1651 Fort Casimir was established near modern New Castle. Conflicts between the Dutch and the Swedes escalated to military conflict, as both

groups infringed on the colonial interests of the other. The Dutch were ascendant and they appropriated the Swedish colonies. Fort Casimir was renamed Fort Trinity, and New Amstel, a farming and trading settlement, arose nearby. The Dutch claims included all land from the Christina River to Bombay Hook by the early 1660s, including a portion of the study area. British hegemony of the region began in 1664 when Sir Robert Carr seized the Dutch colonies and, assumed possession for James, Duke of York and Albany. Anglicizing the new colony was a slow and gradual process. The transfer of authority from Dutch to British hands was peaceful with existing land ownership, trading privileges and political structure maintained by the new leadership. The Swedish, Finnish, and Dutch colonists remained and new immigrants of those nationalities, as well as English and Scotch-Irish, supplemented the growing population to form a multi-ethnic community.

In 1682, William Penn was granted proprietary rights over Pennsylvania and the Lower Three Counties which included the city of New Castle, the land within a 12-mile radius of the New Castle courthouse, and the land on the west bank of the Delaware Bay (including all of modern Delaware). Conflicts soon developed between the pacifist Quakers of Pennsylvania and the colonists of the Three Lower Counties, and these led to the establishment of separate governmental bodies and relative autonomy for the southern colonists. However, economic ties continued to link Penn's factionalized colony. The Penn family's claims to interest in the colony were finally relinquished just prior to the American Revolution.

The early Dutch and Swedish pattern of settlement with closely spaced villages along the Delaware River was gradually replaced by the English colonial settlement pattern of scattered farmsteads along emerging transpeninsular roads. This pattern of scattered settlement was encouraged by economic factors. For example, Philadelphia mercantile interests required increasing numbers of marketable foodstuffs for local and export markets and land speculators parceled huge tracts of productive farmland obtained from Penn. Philadelphia's emerging economic influence during the 18th century caused a shift in agricultural activities in Delaware from subsistence to market-oriented crops.

The waterways were important to transportation and commerce as early roads were limited in number and of poor condition. The few existing roads led to landings on rivers and the Delaware Bay where produce and goods were shipped by cheaper, and more efficient, water transport. Some of these locations are included in the Study Area. The Delaware River - Delaware Bay served as a major focus of water transportation because the majority of Delaware's streams flow eastward to these water bodies. For this reason the large port city of Philadelphia, and to a lesser extent Wilmington and New Castle, exerted major commercial influence on the Delaware counties throughout the 18th century and later. Wilmington, New Castle, and Lewes were also ports for ocean-going vessels involved in export trade. Overland transport was limited to a few major roads, such as the 18th century post road connecting Philadelphia - Wilmington - New Castle - Odessa - Middletown - Dover - Lewes with a western branch at Milford

linking it to the Chesapeake Bay. Small secondary roads and paths interconnected the numerous villages and hamlets and are common within the Study Area.

By the middle of the 18th century population increases and commercial expansion stimulated the growth of towns and the development of transportation and industry. During the 1730s successful attempts were made to harness waterpower on the Brandywine and Christina Rivers resulting in the establishment of Wilmington as the foremost milling and shipping center in Delaware. The availability of wheat from the central Mid-Atlantic region, easy and economical transportation, and the proximity of the Philadelphia and New York markets facilitated the commercial rise of the Brandywine mills. During the later part of the 18th century Wilmington's economy focused on shipbuilding, coopering, milling, and import-export trade.

The rise of commerce and industry in Wilmington produced significant effects on the rural areas of New Castle and Kent counties. The technologies utilized in the Brandywine Valley spread to these areas resulting in a extensive network of mills throughout the colony. Millworks in the agrarian areas were frequently multi-functional with water-powered grist, saw and (woolen cloth) fulling operations being performed at different seasons at the same location. The mills primarily produced goods for local markets. At this time, the agrarian Delmarva Peninsula was considered an area of portage between the Chesapeake Bay markets (Annapolis and Baltimore) and the Delaware River and Bay markets (Philadelphia and New York).

The early decades of the 19th century saw the beginning of an agricultural revolution throughout Delaware, most extensively in New Castle County. The first agricultural society in the United States was formed in New Castle County in 1804 with a strong focus on scientific agricultural practices. A number of factors worked in conjunction to establish New Castle County, and Delaware as a whole, as an important agricultural producer. The discovery of marl, a natural fertilizer, during the construction of the Chesapeake and Delaware Canal in the 1820s enhanced the productivity of Delaware agriculture while the opening of the canal encouraged the production of market-oriented crops because produce could be quickly and cheaply transported to markets.

The opening of the Philadelphia, Wilmington and Baltimore Railroad in 1839 provided transportation of northern Delaware produce to the growing eastern markets. The extensive production of market-bound crops developed later in Kent and Sussex counties due to a lack of interior transportation facilities, although produce did move by water from seaport towns. When the Delaware Line extended rail service to Dover and later Seaford in the 1850s, a vast agricultural hinterland was opened and agricultural production for markets increased significantly.

Prior to 1832 Delaware's agricultural products were primarily grains, with fruit and vegetable crops of lesser importance. During the period 1832-1870 Delaware became the center for peach production in the eastern United States. Rich soil, favorable climate and rainfall, excellent transportation facilities, and strategic location near large markets made peach production a lucrative enterprise. Delaware City with its canal

location led Delaware and New Castle county in production until the peach blight of the 1850s. The peach industry was hindered in Kent and Sussex counties until the 1850s due to transportation limitations. Early attempts there failed because producers could not move fruit to market economically. Rail service into the area and the absence of the peach blight in the southern counties made the peach industry economical in the 1850s. By the end of the "peach boom", massive harvests were being shipped by rail and steamship lines to New York where much was readied for resale to the northern states. The peach industry proved profitable for a large number of peach growers, as well as a variety of support industries. Basket factories, canneries, and peach tree nurseries all aided in and reaped the financial rewards of the peach industry. The railroad and steamship lines integral to peach distribution, depended on peach shipment for a large portion of their annual revenue. The construction of "peach houses" of the Italiante architectural style accompanied the influx of money which resulted from the growth of the peach industry and peach houses are common in the Study Area.

Through the 19th century, and into the 20th century, Delaware's agricultural production continued to focus on the perishable products with a decrease in staples. There has been marked increase in milk and poultry production while the levels of fruit and vegetable production were maintained. Cash crops such as tobacco, have been of importance on a small scale in Kent and Sussex counties.

Throughout Delaware's agricultural history farm labor has been a valued commodity. In the colonial period blacks in slavery and white indentured servants were the primary farm laborers. By the mid-18th century white indentured servants were as numerous as black slaves. Slightly less than one-half of the blacks in the state in 1790 were free; however, by 1810, less than one-quarter of blacks were slaves according to federal censuses. Therefore, in the 18th century, free black laborers played an increasing role in farm production. Abolitionist attitudes were strong in Delaware and legislation enacted by Quaker and Methodist leaders restricted the increase of slaveholding, especially in New Castle and Kent counties, by prohibiting the importation and exportation of slaves. Agricultural factors, as well, reduced the profitability of slaveholding and thus a combination of ethical and economic factors were responsible for the increase in the free black population in the state prior to Emancipation and the Civil War.

The patterning and density of settlement in Delaware, and the Study Area specifically, have been strongly influenced by several factors throughout its history, These are: 1) an agrarian economy; 2) the commodity demands of large markets, first Europe and the West Indies, and later domestic commercial-industrial centers, and 3) transportation facilities. The advent of automobile transportation in the 20th century brought about significant improvements in the state road system and opened large tracts of land to productive agriculture. The DuPont Highway constructed in the 1920's linked the northern and southern sections of the state and shifted the agrarian focus of

the southern counties permanently toward non-local markets.

Based upon this historic summary, several kinds of sites can be expected in the project area. Given the predominantly agrarian nature of the history of Red Lion Hundred, nearly all of these sites would have been linked to agriculture or to transportation routes used for the marketing of agricultural products. For the seventeenth century, these points would have been situated along Red Lion, St. Georges, and Dragon Creeks, the major transportation routes of the period. Since sites from this period are extremely rare and are unknown from the Project Area, any sites from this century would be valuable.

In the eighteenth century, the development of the Philadelphia to Lewes post road, also known as the King's Highway, marked the first substantial north-south route on the Delmarva peninsula. This route, constructed in the 1730s, improved regional transportation and probably stimulated the development of farmland along its length. Crossroads stimulated development at intersections like Wrangle Hill, in the Project Area, and Red Lion, about one-half mile west of it. The village of St. Georges emerged as a transshipment point and a ferry crossing. The Chesapeake and Delaware Canal was completed in 1829 but did not largely alter the agrarian character of the hundred. This pattern was perpetuated into the twentieth century and was only modified with the contsruction of the petrochemical industries at Delaware City in the 1960s. Nearly all of the historic sites one may expect to find in the Project Area would be farmsites reflecting a slow gradual development of the

hundred. Historically, since most of the farm products from the Project Area were grown for market, the growth rate of farming during the 18th, 19th, and 20th centuries would be subject to fluctuations in market conditions and the general health of the economy. The remaining sites would be those at transportation nodes such as crossroads, ferries, or shipping points like St. Georges and Wrangle Hill.

The expected sites can be placed within an historic framework developed in the Delaware Statewide Comprehensive Historic Preservation Plan (Ames, Herman, and Siders 1987). Several historic themes and temporal periods are defined and the data from the Route 13 North survey could be used to better understand specific themes outlined. The predominant contextual theme of Agriculture can be explored for the development of such things as land use and the rate of land clearing, the shift from subsistence/market farming to full market farming, tenant/land owner relationships, and the growth of farming as a science.

The theme of Initial Landscape is poorly understood for Delaware. The documented early settlement took place on the Delaware Bay shore and along the meandering tidal streams leading back from the shore (Hoffecker 1977; Munroe 1984; Scharf 1888; Weslager 1961, 1967; Wise 1980). Most of the settlement took the form of dispersed family farmsteads where the farmhouse was located close to the navigable stream. The lot configuration was in the "long lot" arrangement, where the lots ran perpendicular to the navigable stream and each occupant had frontage on the stream. In the late 17th century, mills and mill dams developed along the courses of the tidal streams but were never the focus

of any concentrated settlement (Wise 1980).

An examination of the plat maps associated with the Penn Warrants and Surveys (University of Delaware microfilm reel no. 86) for the late 17th century shows that within the project area, the Kings Highway had been extended southward from New Castle through St. Georges and Appoquinimy [now Odessa] and connected with several local cart roads, including places like "Jacob Young's Landing" and Head of Elk, Maryland. Dwellings and other buildings are also depicted and frequently labeled with the name of an owner or tenant. The Penn warrants were then examined further to include the period extending up to the mid-18th century. For the entire time span from the 1680s to the mid-18th century, no sites are shown which can be said to be indisputably lying directly within the Proposed Right-of-Way of the Relief Route. However, two sites were noted along the King's Road (approximate Right-of-Way of present U.S. 13) which <u>may</u> be affected by the Relief Route construction. A 1736 plat for the land of Valentine and Isaac Dushene shows a fulling mill located just southeast of the juncture of Scott's Run and the King's Road. No trace of the mill remains today and in any event, it is outside of the present Proposed Right-of-Way and thus unlikely to be affected. A second site was noted lying northwest of St. Georges, on a plantation called "New Utrecht," laid out for Hendrik Vander Burgh in 1683. The plat shows a house occupied by one Robert Seam and it appears to lie somewhere on the present David Meck farm (see Parcel 5 below). A search for this site will be incorporated into the Phase I survey of this parcel.

Seventeenth century sites are virtually unknown archaeologically for this part of the Delmarva and early 18th century sites are also poorly understood. Any kind of site within this time bracket would be useful in testing the assumptions made above.

A third historic context which could be explored is the theme of "Transportation and Communication," which would look at the effects of the nautical and terrestrial transportation systems on the history of the area. The two largest of these of course are the King's Road, in use by the 1680s and now largely subsumed by the present Right-of-Way of U.S. 13, and the C & D Canal, opened in 1829 and extensively enlarged and modified since then. The King's Road was the first major north-south land route and ended several decades of almost total dependence upon water travel. Although the coastal plain streams continued to be important transportation routes, the King's Road helped to promote land travel by serving as an artery connecting smaller local service roads to the small towns along the peninsula. The C & D Canal carried 100,000 tons of cargo in 1837, only 8 years after it opened, and reached its peak in the year 1872, when 1,318,772 tons were transported (Snyder and Guss 1974). Delaware City, Delaware and Chesapeake City, Maryland, the terminus towns at either end of the canal, were not established until its contruction. However, locks were established at Chesapeake City and at St. Georges, Delaware and the King's Highway crossed the canal at St. Georges. These points would have served various capacities during construction of the canal and after its completion, including: housing for construction workers, supply

points for food and equipment needed for construction, housing for lock tenders and mule drivers, stabling for mules, transshipment points for marketable farm products, access points for passengers for coastal packets, the locations of marine supply stores for canal shipping, and support facilites for canal maintenance crews. It is expected that at least some of these features could be recovered archaeologically, although later canal widening and other improvements may have obliterated the sites.

RESEARCH DESIGN AND BACKGROUND RESEARCH

The primary goal of the Phase I survey was the simple location and identification of cultural resources within the Proposed Right-of-Way. Therefore, it is difficult to link the Phase I survey with an explicit research design. However, it is possible to apply some of the general and specific predictive models for the location of prehistoric sites in Delaware's High Coastal Plain. The potential site locations identified by these models can then be the focus of more intensive fieldwork.

Based on numerous studies of prehistoric site distributions in Delaware's High Coastal Plain (Custer 1984; Custer, Bachman, and Grettler 1987; Custer and DeSantis 1986), the areas adjacent to major drainages are the focus of the most intensive and extensive prehistoric settlement. Because there are no such settings in the current study area, large base camp sites are expected to occur only rarely in the Project Area. Nonetheless, the Project Area does cross numerous smaller drainages and these settings may be the locations of prehistoric sites, including

small base camps and procurement sites. Some low order ephemeral drainages with associated springheads and poorly drained interior settings may also be the location of transient camps and procurement sites. Generally, settlement along the major drainages is expected for all time periods. Use of interior locales is most likely during Woodland I times. Figure 4 shows the anticipated locations of prehistoric sites based on general predictive models and the more specific LANDSAT-based model.

Prior to and during the Phase I survey, previous archaeological planning studies (Custer, Jehle, Klatka, and Eveleigh 1984; Custer and Bachman 1986; Custer, Bachman, and Grettler 1986, 1987) were consulted to ascertain the presence of known archaeological cultural resources within the Proposed Right-of-Way. Historic maps and atlases (Penn Warrants and Surveys, various years; 1737 Map drawn by Eastburn, Figure 5; Rea and Price 1849, Figure 6; Pomeroy and Beers 1868, Figure 7; Baist 1893, Figure 8; Bausman 1941, Figure 9; and the USGS Topographic Survey (1953) 1970, Figure 10) were consulted for the locations of former standing structures which have now become archaeological sites. Current landowners and tenants were queried regarding any observations they may have made about cultural resources on their property. From these sources, possible locations of prehistoric and historic cultural resources were plotted and examined during the survey.

FIELD AND LAB METHODS

The Phase I archaeological field methods included a mixture of pedestrian survey and shovel test pits within and immediately

FIGURE 4

Predicted Prehistoric Site Locations

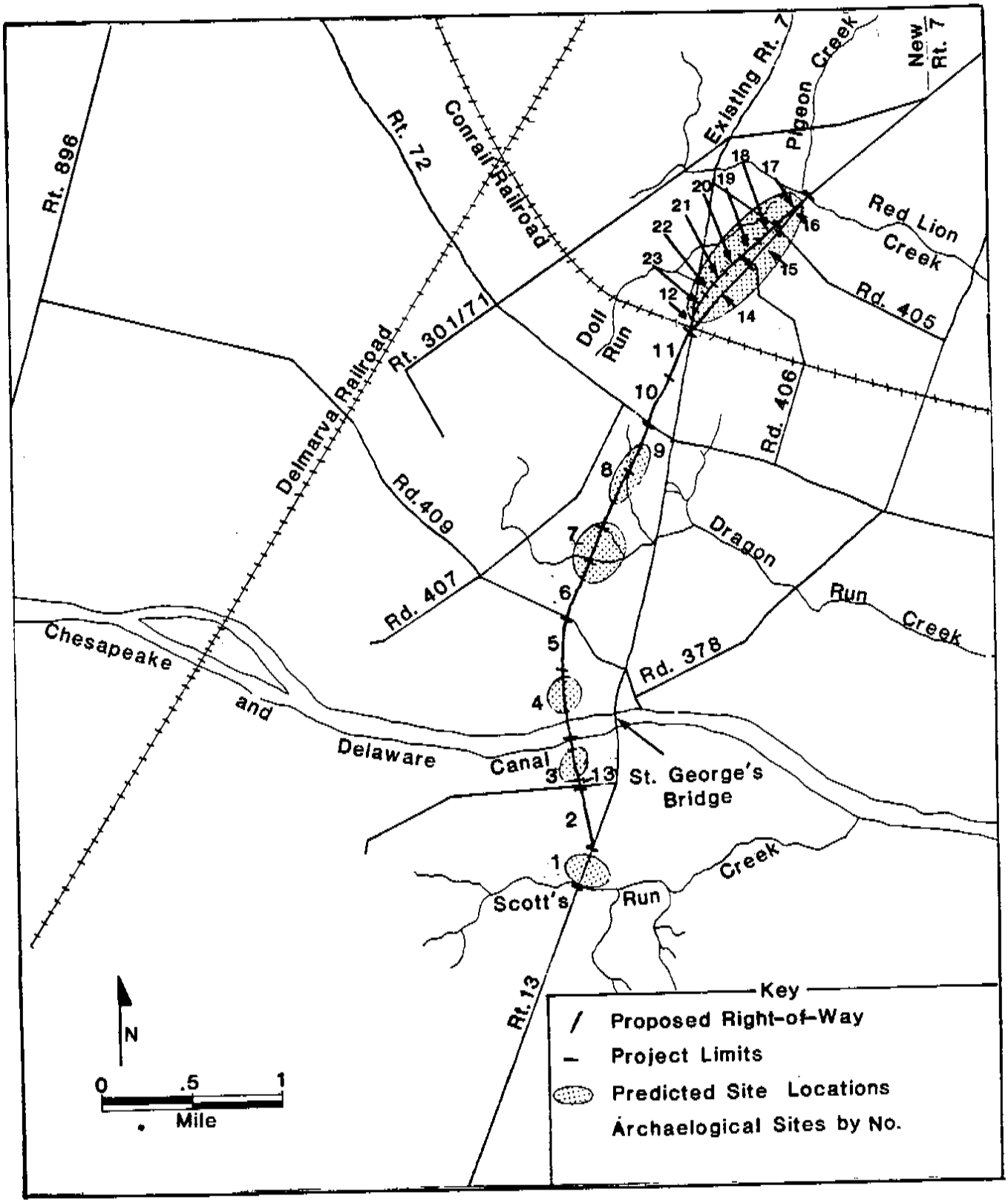
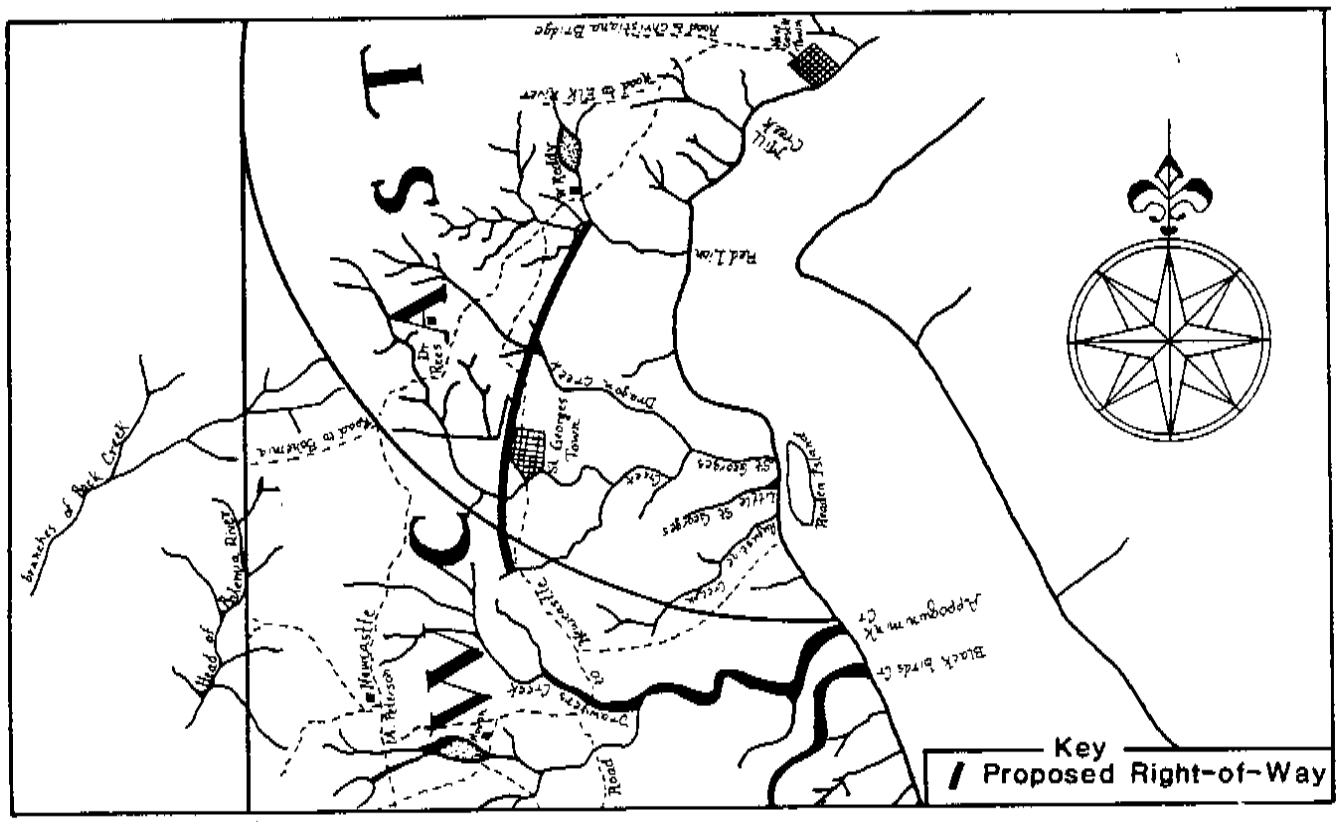


FIGURE 5

Detail of Eastburn's 1737 Map of Delaware for the Project Area



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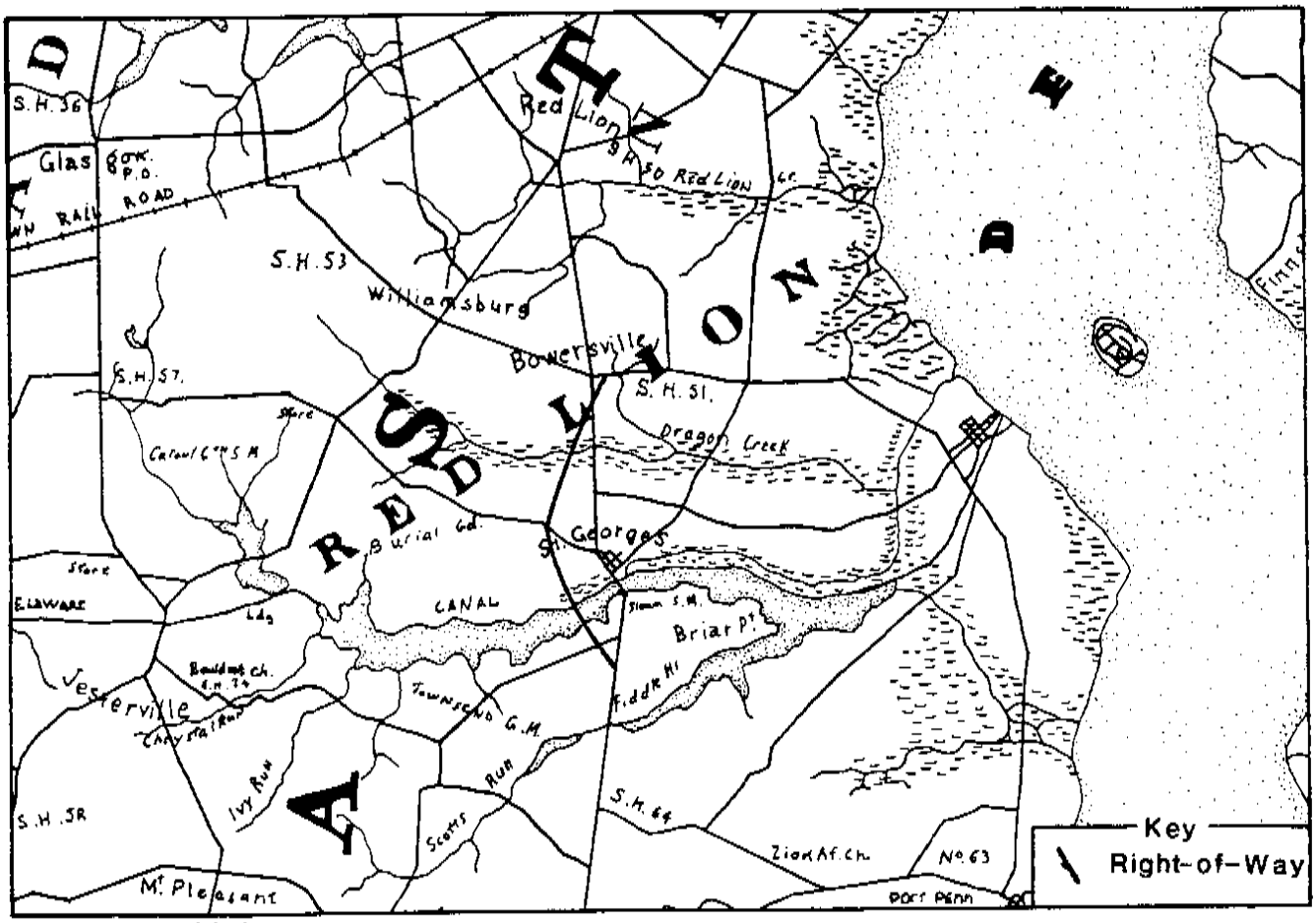
adjacent to the Proposed Right-of-Way, and were similar to the field methods employed during the Early Action Segment Survey (Bachman, Grettler, and Custer 1988). The entire length of the Chesapeake and Delaware Canal section of the Odessa segment was subjected to pedestrian survey, including the main trunk of the Proposed Right-of-Way, service roads, access ramps, and one toll booth location.

Surface visibility throughout the majority of the Proposed Right-of-Way ranged from approximately 50% visibility to more than 90% visibility in those areas where pedestrian surveys were conducted. The standard excavation procedure was to place shovel test pits at 40 foot intervals, in grid fashion, in those areas

FIGURE 6

Detail of Rea and Price's 1849 Map of New Castle County, Delaware from Original Surveys for the Project Area



Redrawn from original

within the Proposed Right-of-Way which were thought likely to produce cultural materials. Shovel test pits were placed along the centerline in some cases as well as at angles to and parallel with the centerline. Shovel test pit locations are shown in the parcel maps which follow.

Artifacts located on the surface during the pedestrian survey and in excavated shovel test pits were plotted on one-foot contour field maps (scale: 1 inch equals 100 feet) provided by the Division of Highways. For a complete list of all artifacts found during Phase I, see Appendix I. All shovel test pits were

FIGURE 7

Detail of Beer's 1868 Atlas of Delaware for the Project Area

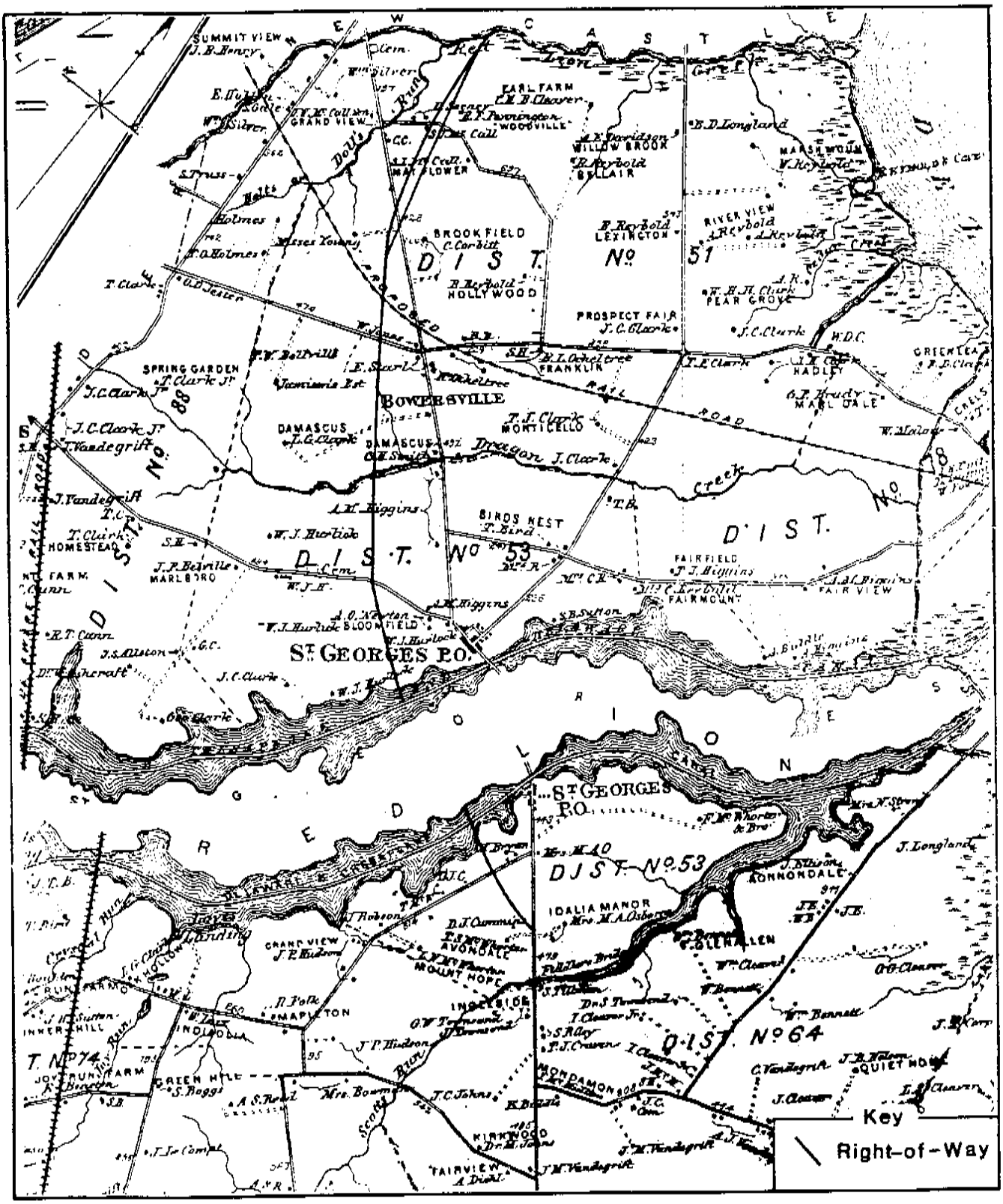


FIGURE 8

Detail of Baist's 1893 Atlas of the State of Delaware, New Castle County, for the Project Area

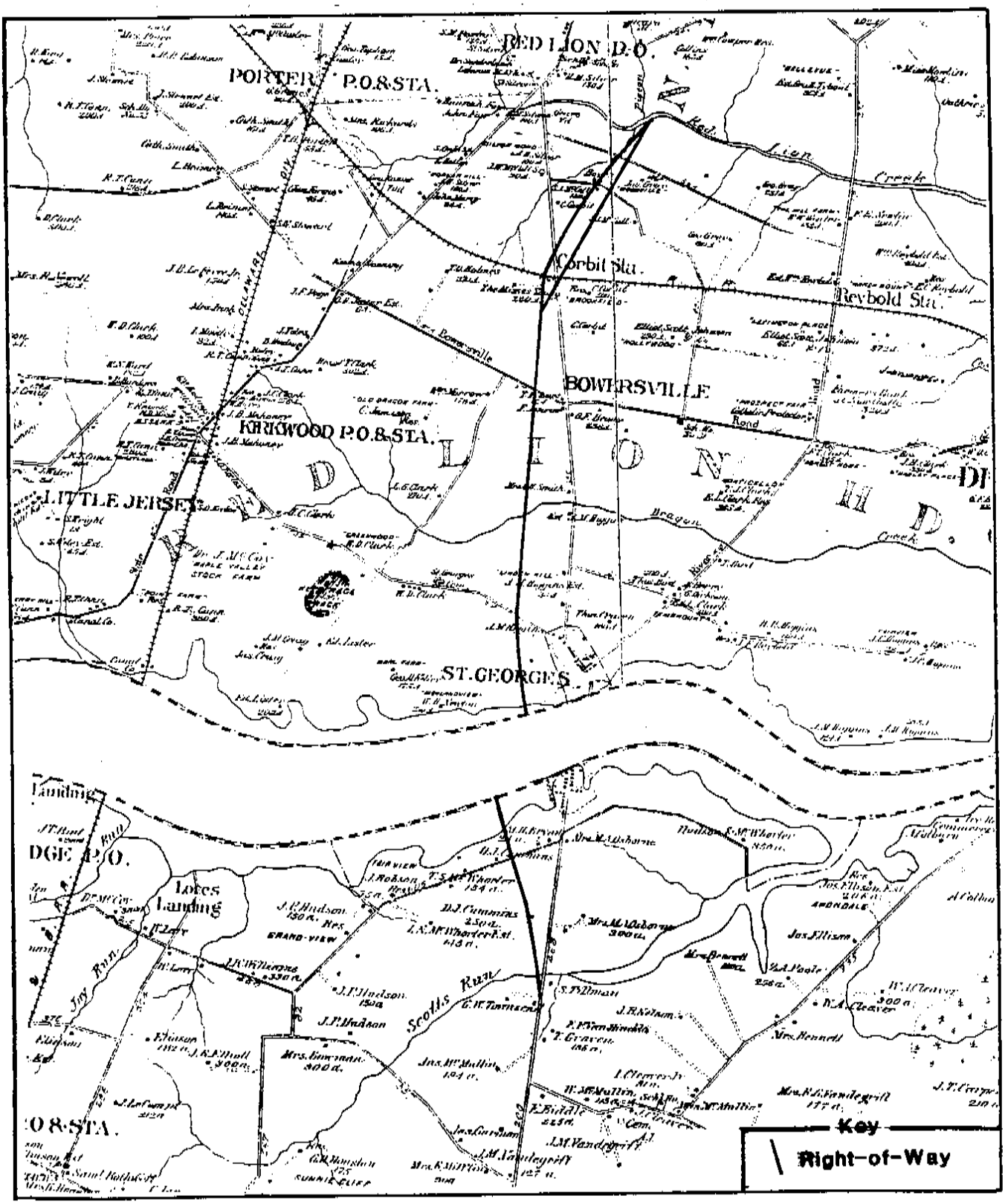


FIGURE 9

Detail of Bausman's 1941 Land Classification Map of New Castle County for the Project Area

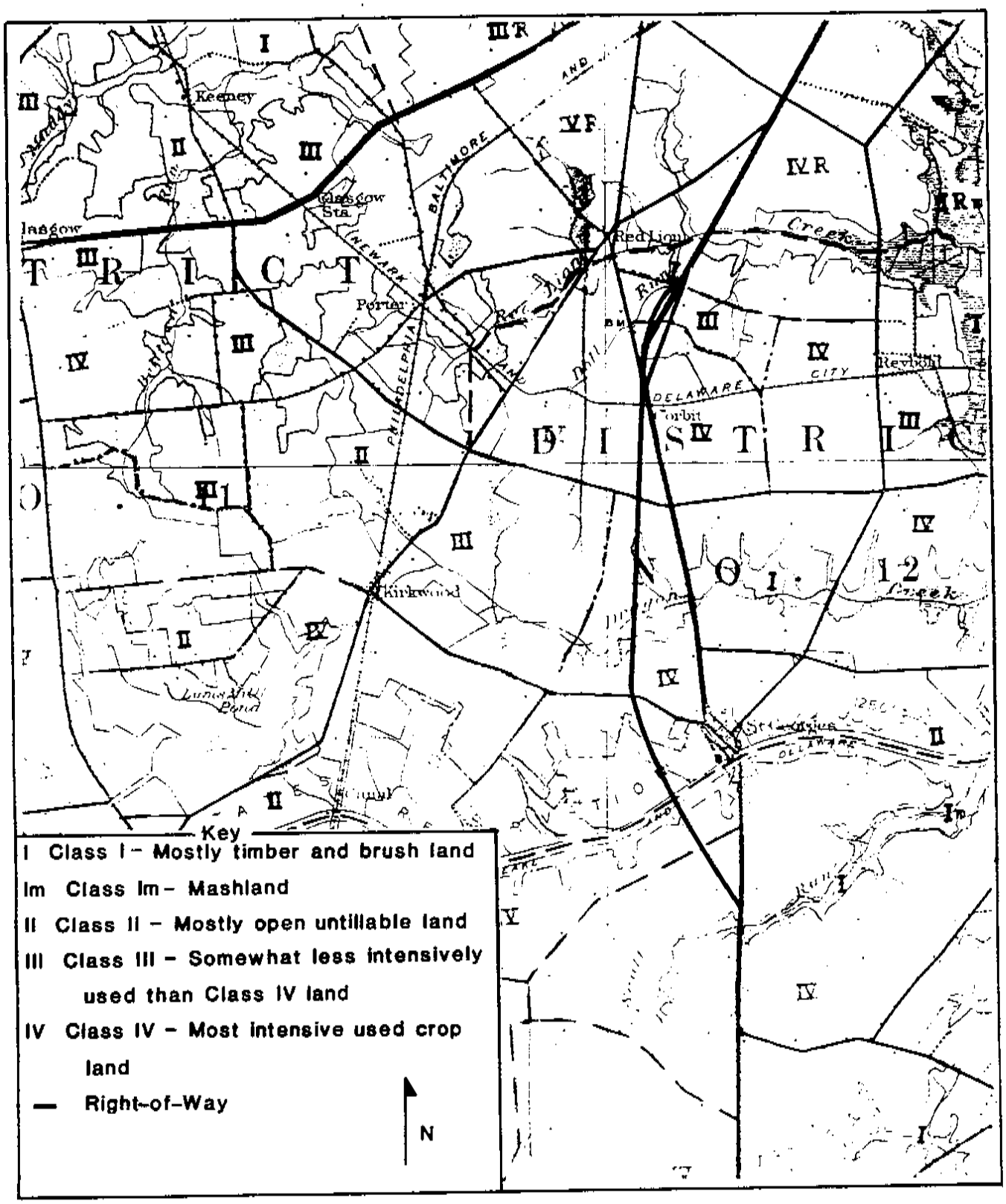
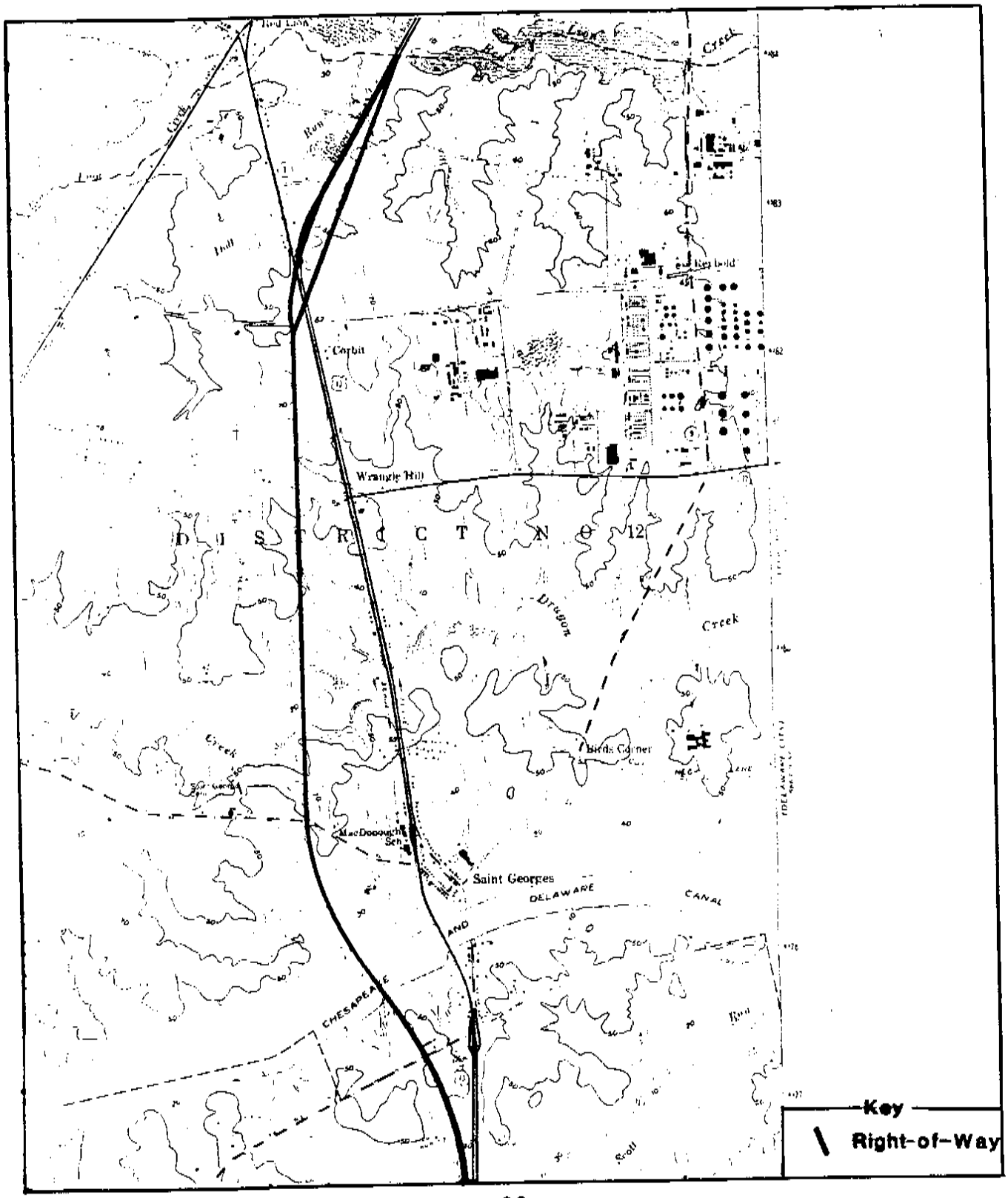


FIGURE 10

Detail of 1953 (1970) USGS Topographic Map for the Project Area



excavated to culturally sterile soil and all excavated soil was screened through 1/4" mesh. Stratigraphic soil data was recorded on standardized log sheets.

Although the station numbers on the highly accurate one-foot contour maps used in this survey were not keyed to the original Division of Highways Engineering Report's station numbers, careful distance measurements between these two maps allowed for accurate mapping of the archaeological data. Figures depicting the survey results reference the station numbers from the original engineering report where applicable.

Laboratory methods for the Phase I investigation included the washing, marking, and cataloging of all recovered artifacts according to standard archaeological practices.

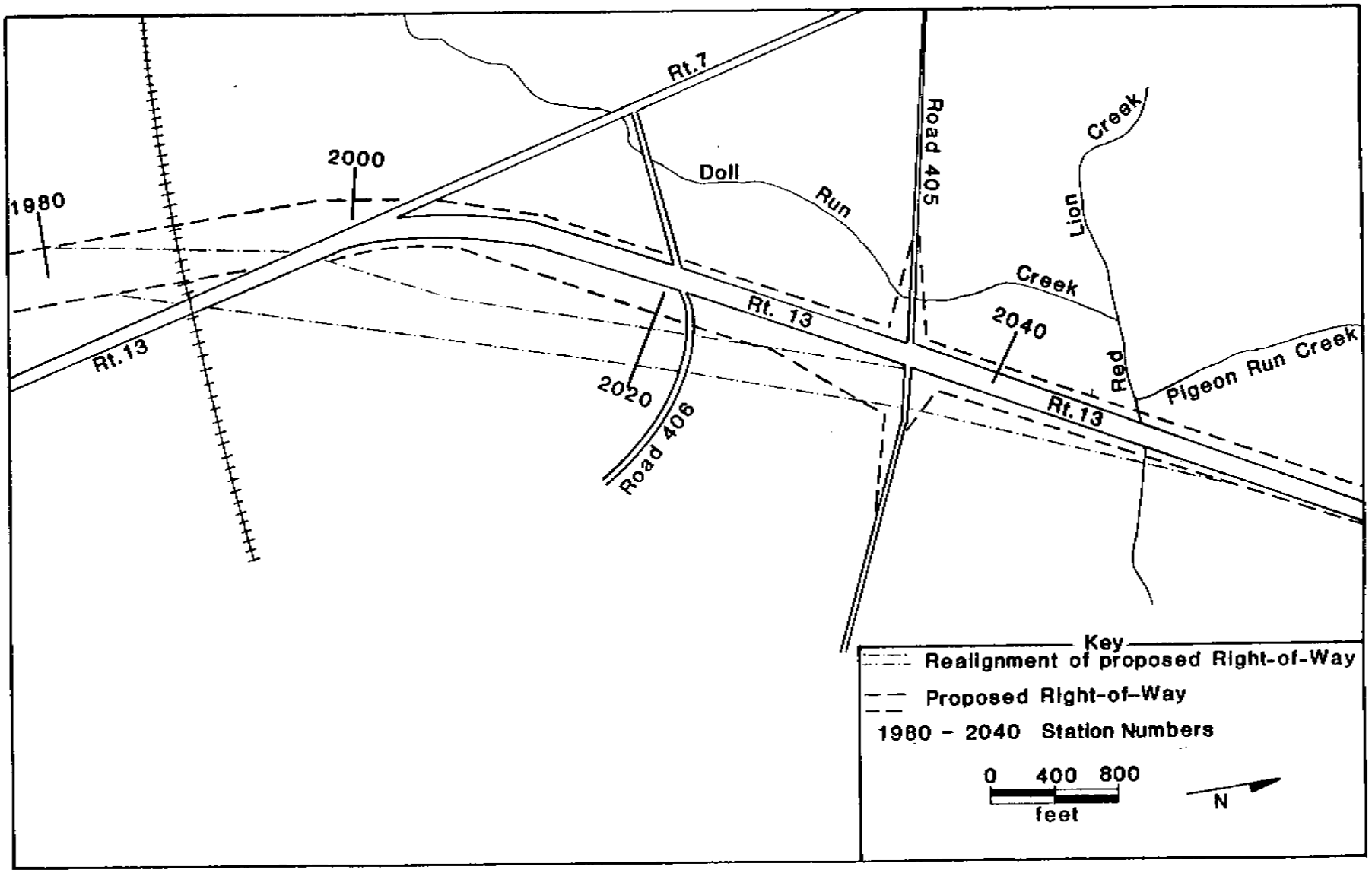
PHASE I SURVEY RESULTS

The Proposed Right-of-Way consisted of two alignments. The first Proposed Alignment began at Scott's Run and moved west from existing Route 13 and then back to existing Route 13 at the intersection of existing Route 7 and Route 13. From there, the main trunk of the Proposed Right-of-Way had followed existing Route 13 to Red Lion Creek. After the initial Phase I survey was conducted, a shift in the Proposed Right-of-Way alignment moved the Proposed Right-of-Way east of existing Route 13 from the intersection of Route 7 and Route 13 to Red Lion Creek. Figure 11 illustrates the alignment shifts of the Proposed Right-of-Way.

The Proposed Right-of-Way was divided into arbitrary survey parcels to facilitate the testing program. Each parcel was given

FIGURE 11

Map of the Proposed Right-of-Way with the Realignment, U.S. 13 Relief Route



a numerical designation and a surname title taken from parcel property owners and/or tenants, or the surnames were arbitrarily generated. Data recovered and test units placed within a parcel were keyed to that parcel number and name. Parcel boundaries corresponded with natural or legal boundaries and ranged in length from 300 feet to 2000 feet. The parcels are listed below in Table 1 and shown in Figure 2. Following is a discussion of the survey results for each parcel.

Archaeological site loci identified within each parcel are categorized by their need for additional field research. At site locations that are small with limited artifact assemblages and limited integrity, no further work is recommended. The sites for which further fieldwork is recommended may fall into a number of different categories based on the intensity of the recommended additional fieldwork (see the final cultural resource management recommendations and Table 3 for more information).

PARCEL 1 - PARKWAY GRAVEL FIELD AND WOODLOT

Figure 12 shows the Proposed Right-of-Way in this parcel, which is adjacent to existing Route 13 on the west side. The proposed trunk of the alignment and an access road from Lorewood-Grove Road merge with existing Route 13 at Scott's Run on the south, and ends 1700 feet north at a farm lane.

The southern bank of Scott's Run was subjected to pedestrian survey and was found to be a gravel pit now almost completely overgrown with vegetation. Due to the total ground disturbance as a result of the former borrow activities, no subsurface testing was conducted on the south bank of Scott's Run. The

TABLE 1

STUDY PARCELS FOR PHASE I ARCHAEOLOGICAL SURVEY OF U.S. 13 RELIEF ROUTE, SOUTH TO NORTH ALONG PROPOSED RIGHT-OF-WAY, STAs 1779-2060

Parcel Number	Parcel Name	Station Numbers
1	Parkway Gravel Field and Woodlot	1780-1796
2	Lorewood Grove Field	1796-1817
3	Snapp Field	1817-1833
13	Snapp Home	1817-1820
4	Chesapeake and Delaware Canal	1833-1860
5	Weaver Field and Woodlot	1860-1880
6	Lester Field	1880-1899
7	Dragon Run South Field and Woodlot	1899-1915
8	Dragon Run North Field and Woodlot	1915-1939
9	Wrangle Hill South Field	1939-1953
10	Wrangle Hill North Field	1953-1968
11	Conrail South Field	1968-1989
12	Conrail North Field	1989-2005
14	Texaco Field and Woodlot	1989-2020 (E)
15	Smith Woodlot	2020-2035 (E)
16	Red Lion Creek Field and Woodlot	2035-2051 (E)
17	Stanley Woodlot	2038-2051 (W)
18	Leski Woodlot	2030-2038 (W)
19	John Doe Woodlot	2023-2030 (W)
20	Blaschko Woodlot and Yard	2019-2023 (W)
21	Niblett Field	2010-2019 (W)
22	Hemphill Yard	2008-2010 (W)
23	Fairweather Marine Yard	2004-2008 (W)

Key:

(E) = east side of existing Route 13
(W) = west side of existing Route 13

Parkway Gravel Prehistoric Site, 7NC-G-100, was recorded on the northern bank of the creek in a cultivated field (Figure 12). This site is located on the edge of a knoll adjacent to Route 13. Route 13 bisects this knoll and probably disturbed a portion of the site. The western edge of the site is bounded by an ephemeral drainage, while the southern edge of the site is bounded by Scott's Run floodplain. The visibility was greater than 70% for the entire field.

TABLE 3

DATA SIGNIFICANCE POTENTIAL FOR SITES WITHIN THE PROPOSED U.S. 13 RELIEF ROUTE WHERE A PHASE II INVESTIGATION IS RECOMMENDED, SCOTT'S RUN CREEK TO SOUTHERN END OF RELOCATED DELAWARE ROUTE 7 AT TYBOUTS CORNER

CATEGORY 1 - None

CATEGORY 2

Parcel Number	CRS Number	Site Number	Prehistoric Sites
1	N-12116	7NC-G-100	Parkway Gravel Prehistoric Site
3	N-12117	7NC-G-101	Snapp Prehistoric Site
8	N-12126	7NC-G-104	Dragon Run North B Prehistoric Site
11	N-12119 N-12118	7NC-E-93 7NC-E-92	Conrail South A - Conrail South B Prehistoric Site
			Historic Sites
15	N-5053	7NC-E-98	Smith Historic Site

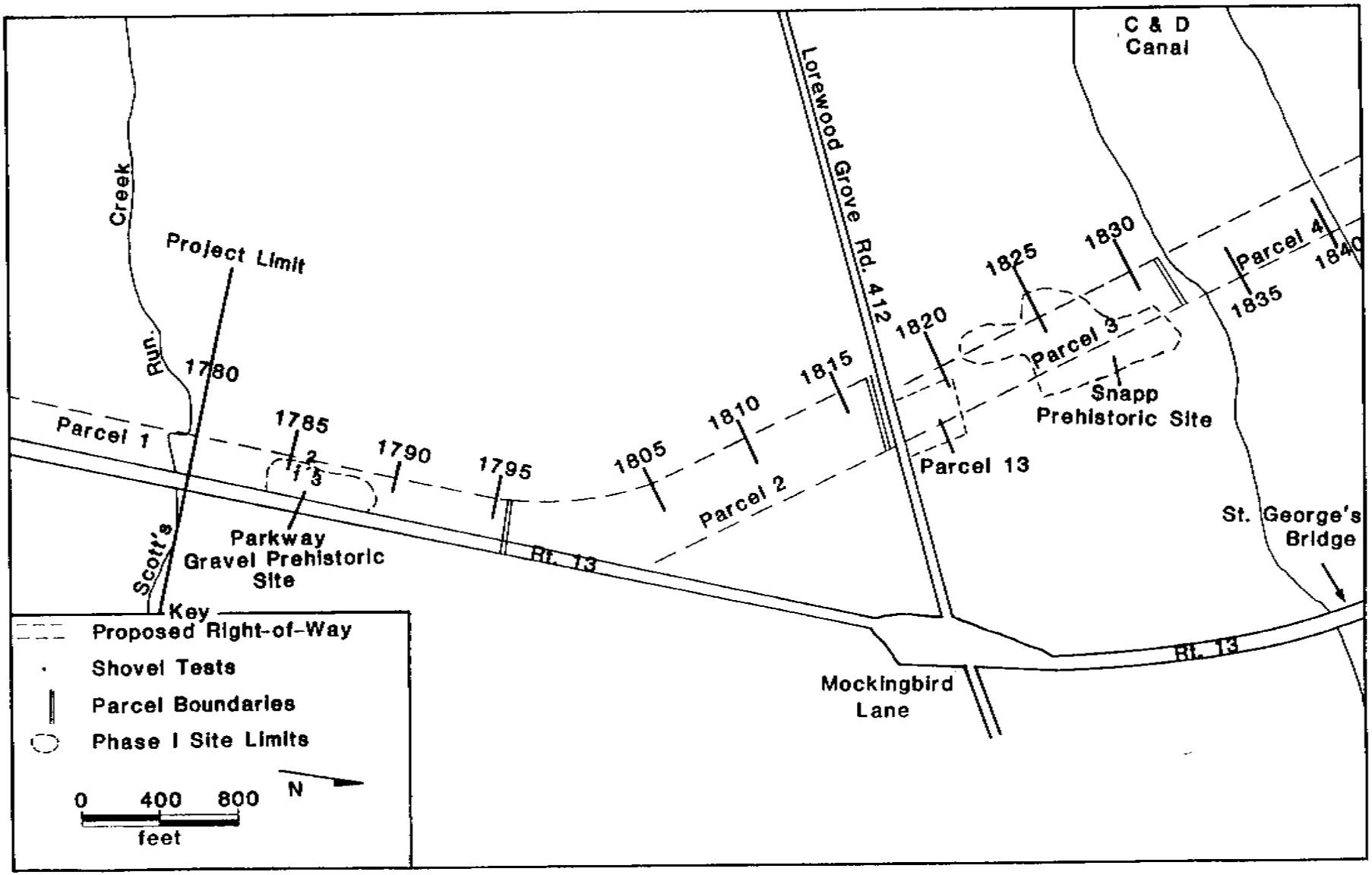
CATEGORY 3

Parcel Number	CRS Number	Site Number	Prehistoric Sites
5	N-12124	7NC-G-102	Weaver Prehistoric Site
8	N-12125	7NC-G-103	Dragon Run North A Prehistoric Site
9	N-12127	7NC-G-105	Wrangle Hill South Prehistoric Site

CATEGORY 4 - None

FIGURE 12

Map of Parcels 1-4: STAs 1780-1840



Artifacts were recovered from a pedestrian survey and consisted of more than 50 fire-cracked rock observed, one quartz core, two chert cores, one utilized chert flake, and a chert straight-stemmed projectile point fragment. Three shovel test pits were excavated adjacent to the ephemeral drainage, in a narrow strip of woodlot which overlooked the floodplain of the ephemeral stream (Figure 12). One jasper flake was recovered from Shovel Test Pit 3. A Woodland I Period site is implied by the recovered artifacts; however, little can be determined regarding function. Soils were historically unplowed, and soil stratigraphy in the shovel test pits consisted of a brown silty humus layer overlying a medium orange brown to yellow brown silty clay. Below this, the soils were yellow brown silty clays with increasing numbers of small and medium sized gravels. Soils in the plowed field were slightly eroded. Site limits identified for 7NC-G-100 are based on the extent of the artifacts found on the surface. Because of the large numbers of fire-cracked rock and other artifacts recovered and because part of the site is in an historically unplowed context, a Phase II investigation is recommended for this prehistoric site.

A concentration of historic artifacts and large rocks were located adjacent to the farm lane, at the western limit of the Proposed Right-of-Way. The majority of the artifacts were green transfer-printed whiteware and assorted bottle glass. The topographic setting that these artifacts and rocks were found in suggests these items were used as rip-rap to control field erosion. In addition to the above mentioned cultural materials, one quartz flake, one fire-cracked rock (observed), and one

quartz late stage biface reject were collected as isolated finds.

PARCEL 2 - LOREWOOD GROVE FIELD

Figure 12 illustrates the alignment in this parcel, a 2100 foot length of the Proposed Right-of-Way which is defined by the farm lane on its southern end and Lorewood-Grove Road New Castle 412 on its northern end. The Proposed Alignment with its access road begins to bend to the northwest towards the proposed bridge crossing over the C & D Canal.

A pedestrian survey was conducted in this no-till corn field with surface visibility being approximately 30-50%. No concentrations of prehistoric artifacts were identified. A half dozen fire-cracked rock were observed on or near the crest of a knoll adjacent to New Castle 412. These artifacts could be associated with the much larger concentrations of fire-cracked rock on nearby Parcel 3 and New castle 412 could have cross-cut the southern end of the prehistoric scatter located in Parcel 3. A light historic field scatter consisting of a few fragments of redware, whiteware, and brick was also noted for this parcel. A small late historic scatter was identified outside of the Proposed Right-of-Way adjacent to New Castle 412. Artifacts included glass insulator fragments, sewer pipe fragments, and clear window glass. Phase II work is not recommended for this parcel unless Phase II examinations at the prehistoric site in Parcel 3 warrants additional work in Parcel 2.

PARCEL 3 - SNAPP FIELD

Parcel 3 extends north from Lorewood-Grove Road (New Castle 412) 1550 feet to the C & D Canal (Figure 12). A pedestrian

survey was conducted over the entire cultivated field through which the Proposed Right-of-Way will pass. Surface visibility of this no-till corn field was approximately 50%.

The Snapp Prehistoric Site, 7NC-G-101, consisting of over 200 fire-cracked rock (observed), 1 quartz early stage biface reject, 1 chert core, one hammerstone, and one unidentifiable groundstone tool fragment, was identified during the pedestrian survey. No historic artifacts were observed. Slight concentrations of the fire-cracked rock were noted in two areas, which were separated by an ephemeral drainage. At this point, little can be concluded regarding the temporal placement or function of this site, but considering the amount of fire-cracked rock present at the site, it is apparent that a large of number of fires were set here and the tools and cores indicate other prehistoric activities also took place. This would suggest that there may also be features present on the site, which could be verified during the Phase II survey. Site 7NC-G-101 is located on a relatively flat terrace west and northwest of a knoll. The site is bounded by steep slopes and an intermittent stream and associated ephemeral drainages on the west side, the C & D Canal on the north, and additional steep slopes and ephemeral drainages on the east. The steep slopes and floodplain settings on the Snapp property were covered by woodlots. These settings are not utilized by prehistoric peoples and thus were not subjected to surbsurface testing. The fire-cracked rock observed south of Lorewood-Grove Road (New Castle 412), mentioned in the Parcel 2 discussion, may be an extension of this prehistoric site.

Topography across the cultivated field suggests minor soil deflation and erosion.

The limits of the site are based on the pedestrian survey only. No sub-surface testing was conducted in the wooded edges around the cultivated field. Because of the large aereal size of the site, and the presence of tools, a core, and large numbers of fire-cracked rock, Phase II work is recommended for this site.

PARCEL 13 - SNAPP HOME

Parcel 13 consists of a 300' X 300' rural residential property which was subjected to extensive shovel testing (Figure 12). Beers' (1868, Figure 7) and Baist's (1893, Figure 8) Atlases indicate a standing structure on or near this parcel. Presently, a 20th century dwelling and outbuildings are located on this parcel. A historic standing structure is located on the adjacent property (N-5249). This 1849-1868 agricultural complex (Custer, Jehle, Klatka, and Eveleigh 1984) is located on Beers' (1868, Figure 7) and Baist's (1893, Figure 8) Atlases. The present owner informed the authors that this structure once served as a stage depot and shipping terminal, and is 157 years old.

A total of 43 shovel test pits were excavated in grid fashion on Parcel 13 in an attempt to identify cultural materials and architectural remains. Very few artifacts were recovered from the shovel test pits. These artifacts included a non-diagnostic projectile point, one ironstone and one stoneware fragment, three bottle glass fragments, two lamp glass fragments,

one clam shell, and one cut nail fragment. Shovel Test Pit 6 located a feature of unknown origin. The feature was capped by a 0.8 foot plowzone layer overlying an organic compact clayey layer with gravels. The plowzone produced the non-diagnostic projectile point. The feature fill was a mottled brown clay with scant charcoal flecking and produced lightbulb or lamp glass fragments. Shovel Test Pit 24 located a modern rubble feature. The feature contained modern brick fragments, cinder blocks, aluminum foil, melted plastic, and miscellaneous iron fragments and continued below the portion excavated. This feature was capped by a sterile plowzone. Shovel Test Pit 32 identified what is believed to be a septic drain field. Soil stratigraphy exhibited by the shovel test pits generally consisted of a brown silty clay plowzone overlying a brown to orange-brown clayey subsoil.

The shovel testing conducted on this parcel failed to identify any clear early architectural remains which would be indicative of the above mentioned structure. Therefore, no further work is recommended.

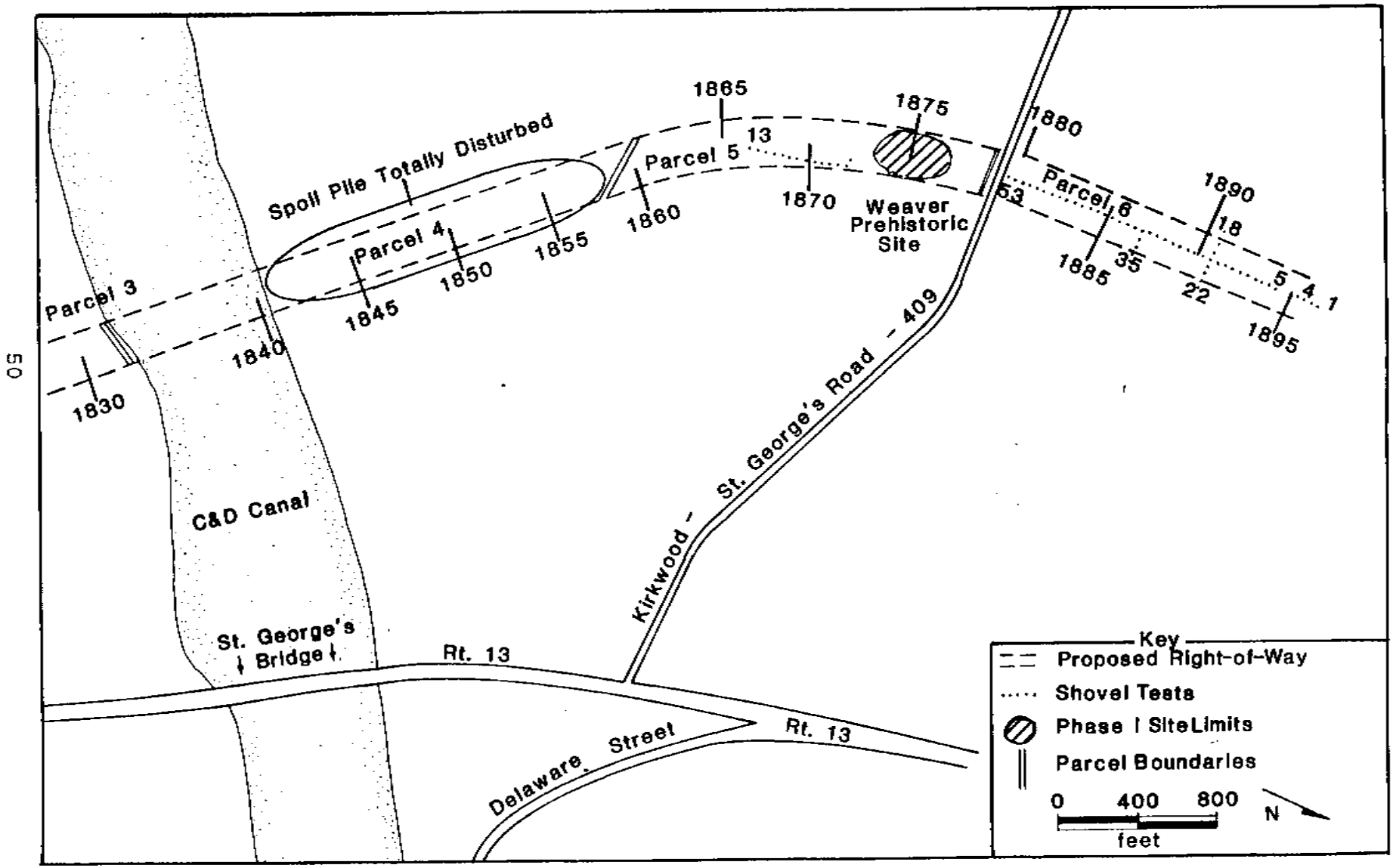
PARCEL 4 - CHESAPEAKE AND DELAWARE CANAL

The C & D Canal segment of the Proposed Right-of-Way extends from the south bank of the present canal, north 2800 feet, to the base of the spoil pile resulting from the canal construction (Figures 12 and 13).

The construction of the C & D Canal is summarized and abstracted from Munroe (1979, 1984:108-109). The Chesapeake and Delaware Canal was constructed in the years 1824-1829 and was a

FIGURE 13

Map of Parcels 3(partial)-6(partial): STAs 1830-1895



privately funded endeavor. The original plan was to connect the Elk River with the Christina River and in 1804, Joseph Tatnall, a Brandywine miller who was the first company president, began construction of a feeder canal that would bring water from the upper Elk to the middle stretches of the main canal at Glasgow. The company's funds were exhausted within a year and all construction stopped until 1824, when stock subscriptions by the states of Maryland, Delaware, and Pennsylvania and by the United States government allowed work to be resumed.

The canal's Delaware terminus was below New Castle and in Maryland it entered Back Creek, a tributary of the Elk River. This route is different from the originally planned route. The new route had been recommended by army engineers, who were forced to avoid the Christina River after bridges were built at Wilmington and Newport. The new route also allowed for more direct access to the Delaware Bay and was thought to have been more economical to the principal sponsors of the canal. These sponsors were Philadelphia merchants who hoped that the canal would divert central Pennsylvania products, floated down the Susquehanna River, from going to Baltimore. However, the Philadelphia merchants had no desire to develop another rival port at Wilmington in the process. Delaware City and Chesapeake City were constructed at the terminal locks on either side of the peninsula. The federal government purchased the canal in 1919 thereby removing it from private ownership. The main terminus was moved to Reedy Point, two miles south of Delaware City. The canal was later enlarged and deepened and the locks were removed to allow for ocean shipping. The canal's main importance was to

give Baltimore a shorter connection to Philadelphia, New York, and ports in western Europe via the Delaware Bay.

No testing was conducted on this parcel due to the construction activities of the canal building and the resulting spoil pile on the north bank. The spoil pile is bounded by a steeply contoured slope which extends higher in elevation than the spoil itself and the top of the spoil pile is largely marsh. No further work is recommended.

PARCEL 5 - WEAVER FIELD AND WOODLOT

Figure 13 illustrates the Proposed Right-of-Way in this parcel. This 1800 foot section of Proposed Right-of-Way stretches from the canal spoil pile (U.S. Government Property Line), north to Kirkwood-St. Georges Road (N.C. 409). Currently owned by Lester Weaver and farmed by David Meck, the parcel contained both wooded areas and cultivated fields. The southern part of the parcel, between centerline STAs 1841 and 1860, was buried under a massive spoil pile (probably C & D Canal dredgings) and no survey could be conducted.

The wooded area near STA 1865 was tested with 13 shovel tests slightly offset from the centerline. These shovel tests produced 20th century trash, brick, oyster shells, metal, and glass fragments. Soils in the shovel tests were a mosaic of gray silty clays and sands as well as brown sandy loams. These soils and artifact types were interpreted as fill from the nearby canal spoil pile.

East and adjacent to the woods and the cultivated field is an alfalfa field. A surface reconnaissance of this field

identified no cultural materials, although visibility was very poor. No shovel testing was conducted in the alfalfa field due to access problems. A pedestrian survey conducted in the cultivated field identified the Weaver Prehistoric Site, 7NC-G-102. Surface visibility was very good. Artifacts collected consisted of four utilized quartz flakes, one quartz unidentifiable biface fragment, one chert core, and one unifacially worked quartz tool which may have been a drill with the tip and base snapped off. Three fire-cracked rock were also observed. Little can be said of this assemblage of artifacts regarding time or function. In addition to the above mentioned prehistoric artifacts, the landowner's son-in-law has a projectile point collection from this area. The site is located on a toe/terrace of a long broad slope of a knoll located to the northeast of the site location. This toe of the slope is defined by ephemeral drainages on the east and west. Boundaries of the prehistoric site were defined by the extent of the surface visible artifacts. Further Phase II work is recommended for site 7NC-G-102.

In addition to the prehistoric artifacts, 25 historic artifacts were observed. This field scatter was comprised of redware, whiteware, stoneware, porcelain, and pearlware fragments, a few assorted glass fragments, and some brick fragments. None of these artifacts could be ascribed to the 17th century Robert Seams occupation mentioned previously and no trace of this site was found during the survey of the Weaver/Meck farm. Beers' 1868 Atlas (Figure 7) shows a cemetery and three

structures located just west of the Proposed Right-of-Way and these artifacts are interpreted as general field scatter related to these occupations.

PARCEL 6 - LESTER FIELD

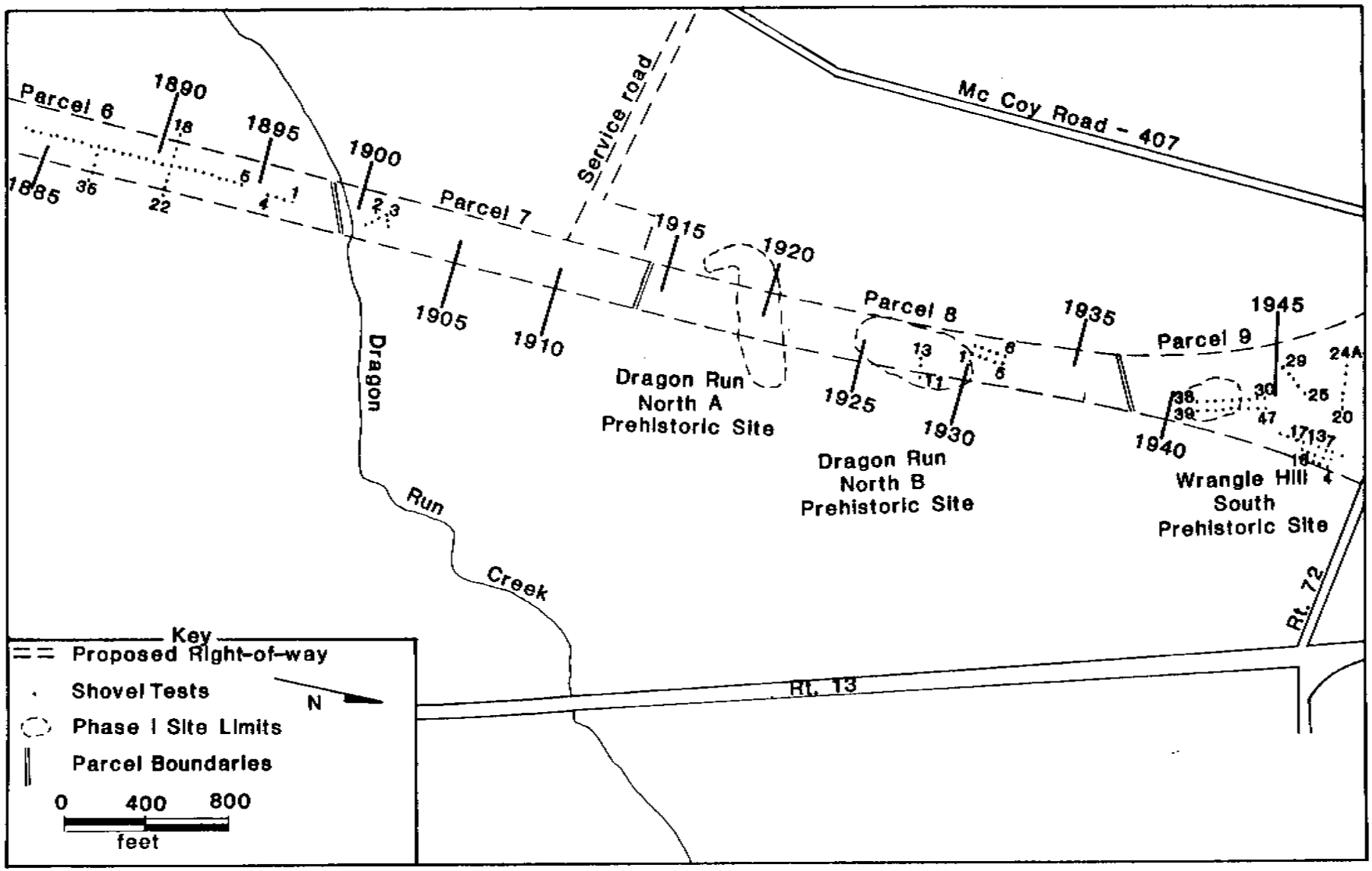
Parcel 6 is a 2100 foot length of Proposed Right-of-Way which is defined by the Kirkwood-St. Georges Bridge Road (New Castle 409) along the southern end and Dragon Creek on the north end (Figures 13 and 14). The parcel is cultivated but visibility was too poor to conduct a pedestrian survey. The north end of the parcel is marked by pronounced topographic relief consisting of a very steep slope to Dragon Creek as well as a very steep wooded ravine and ephemeral drainage located 500 feet south of the creek. This ravine contained metal, glass, and other 20th century trash.

A total of 53 shovel tests were excavated along the centerline and at angles to the centerline in two places (Figures 13 and 14). Shovel Test Pits 5 through 53 were excavated between New Castle 409 and a deep ravine on the north side of the cultivated field. Plowzones consisted of brown silty or sandy loams or clays overlying yellow brown silty clays to orange brown silty or sandy clays.

Artifacts recovered from the shovel tests consisted of one quartz flake each from Shovel Test Pits 7 and 11. A chert teardrop Woodland I projectile point was recovered from the surface near Shovel Test Pit 6. The locations of these artifact producing shovel test pits and the above mentioned projectile point are on a moderately steep slope down to the deep ravine.

FIGURE 14

Map of Parcels 6(partial)-9(partial): STAs 1885-1945



Shovel tests placed roughly perpendicular to the centerline along the upper edge of this slope produced no cultural materials.

Two other shovel test pits (35 and 37) produced a jasper flake and a chert flake respectively. Shovel Tests 35 and 37 are located on the edge of a nearby knoll, which is outside of the Proposed Right-of-Way, and downslope from the knoll. These artifacts may represent the western edge of a prehistoric site located on this nearby knoll. This knoll is defined by a number of surrounding ephemeral drainages.

Shovel Test Pits 1-4 were excavated between the creek and the deep ravine into compacted eroded soils and produced no cultural materials. Soil stratigraphy in these shovel test pits consisted of a dark brown sandy loam plowzone overlying brown to orange-brown sands and sandy silts with gravels.

The total artifact counts for the Lester parcel are few, the artifacts are contained in the plowzone, and erosion is a major factor here. Therefore, further work is not recommended for this parcel within the Proposed Right-of-Way.

PARCEL 7 - DRAGON RUN SOUTH FIELD AND WOODLOT

The Proposed Right-of-Way within this parcel is approximately 1550 feet in length and includes the main trunk of the Right-of-Way, a toll plaza, and a service road from McCoy Road (New Castle 407) to the toll plaza (Figure 14). The parcel is defined by Dragon Creek to the south, and a gravel road, used for access to a nearby gravel pit, to the north.

A pedestrian survey was conducted over the entire length of the parcel including the toll plaza and service road. Visibility

in this cultivated field was excellent. The Proposed Right-of-Way crossed slope edges and ephemeral drainages and these areas are highly eroded. One jasper corner notched Woodland I projectile point was collected from the surface on a small peninsula of land between two ephemeral drainages. One piece of blue-gray stoneware was identified along the proposed service road during the pedestrian survey.

A total of seven shovel test pits were excavated on a small terrace next to Dragon Creek in a woodlot adjacent to the cultivated field (Figure 14). The terrace itself is not much higher in elevation than the creekbed. No cultural materials were recovered in these shovel tests. Soil stratigraphy revealed profiles consisting of slopewashed soils from the nearby field overlying marshy mud soils. No further work is recommended for this parcel.

PARCEL 8 - DRAGON RUN NORTH FIELD AND WOODLOT

Figure 14 illustrates this segment of the Proposed Right-of-Way and includes the identified sites and the shovel testing conducted on this parcel. Parcel 8 is 2500 feet in length and begins at the gravel road to a nearby gravel pit, and stretches north to a point where the Proposed Right-of-Way crosses an unnamed ephemeral tributary of Dragon Creek.

Field methods in this parcel consisted of a pedestrian survey augmented with shovel testing in the adjacent woodlot next to one of the prehistoric sites. Surface visibility in the cultivated field was excellent. The pedestrian survey identified two areas of prehistoric artifact concentrations. Both sites are

located on small knolls and bluff edges adjacent to the unnamed ephemeral tributary of Dragon Creek.

The Dragon Run North A Prehistoric Site, 7NC-G-103, is located on a sharp knoll along the east edge of the Proposed Right-of-Way. The site extends west from this knoll and bends around an ephemeral drainage. Prehistoric artifacts collected and/or observed at this location consisted of five fire-cracked rock (observed), two quartz flakes (observed), two quartz cores, and one anvilstone. Virtually all of the prehistoric artifacts were found in a tight 50x100 foot cluster at the crest of a knoll. Thus it can be characterized as a small but fairly intensely utilized site at a specific site location.

The Dragon Run North B Site, 7NC-G-104, is located approximately 1000 feet north of 7NC-G-103. Prehistoric artifacts collected or observed consisted of one quartz early stage biface reject, one ironstone flake, three fire-cracked rock (observed), and four quartz flakes (observed). This knoll containing site 7NC-G-104 has two small downslope terraces along the bluff edge and overlooking the ephemeral drainage. Both of these terraces were subjected to shovel testing and Shovel Test Pits 1-10 were placed on the lower terrace and 11-13 on the upper terrace. Shovel Test Pit 4 produced one chert flake and Shovel Test Pit 7 produced one piece of jasper shatter. Soil profiles examined in Shovel Test Pits 1-10 revealed a thin humus layer overlying yellow brown to orange brown sand with gravels to sandy clay with gravels. In some cases, these sands with gravels had a layer of gray sand and gravel located above them. This profile suggests that the location had never been historically plowed.

This gray sand and gravel layer produced one chert flake (Shovel Test Pit 4). The soil stratigraphy in Shovel Test Pits 11-13, on the upper terrace, exhibited what appeared to be a brown sandy clay plowzone overlying orange brown sandy clay. Shovel Test Pit 11 produced two ironstone flakes from the plowzone. No temporal or functional placement for either of thes sites could be determined from the Phase I survey.

Historic artifacts were observed in this parcel as a thin field scatter with no identifiable concentrations. These artifacts consisted of redware, shell-edged pearlware, whiteware, Canton-ware porcelain fragments, and a few brick and glass fragments.

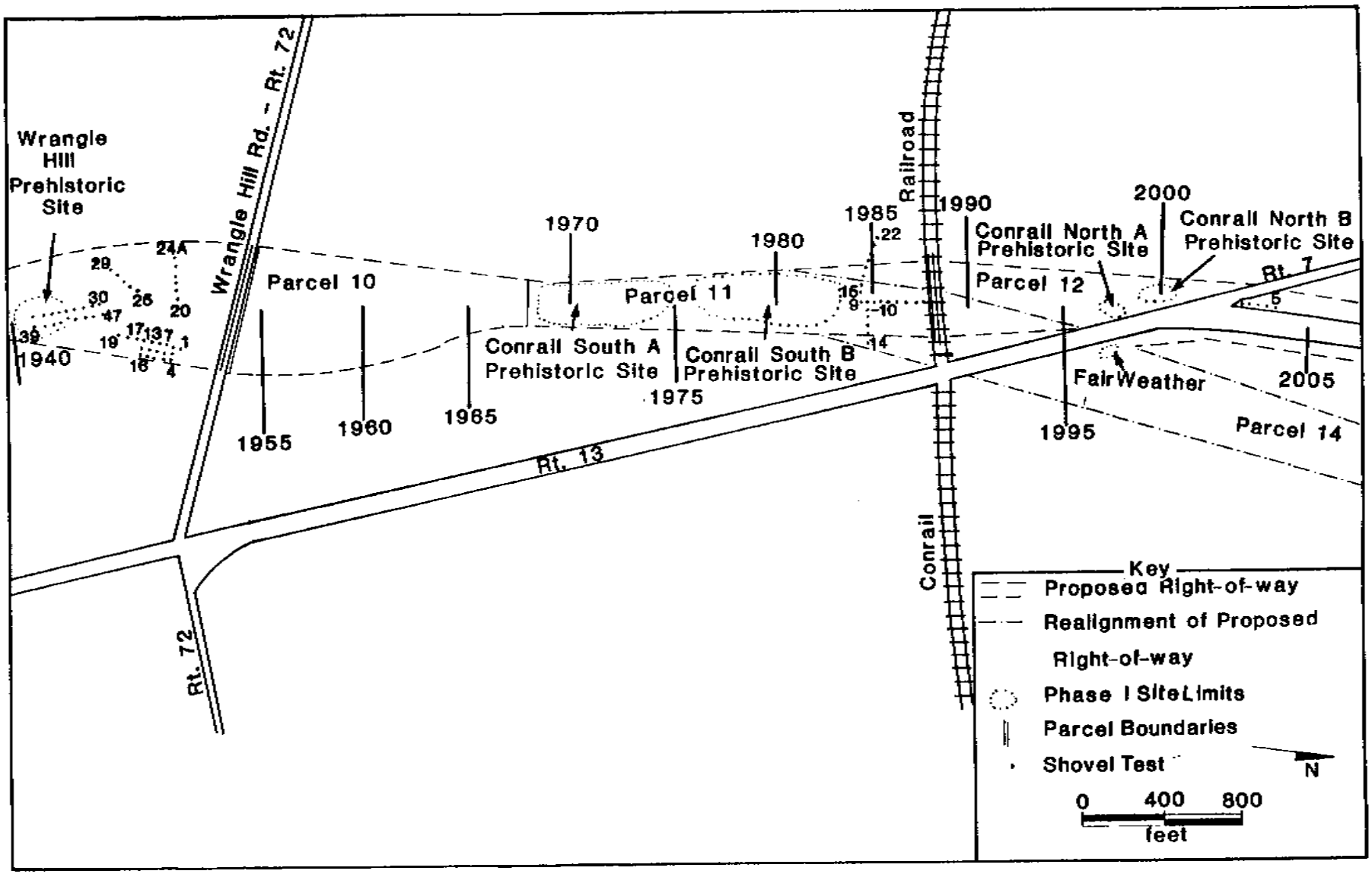
Preliminary site boundaries were established around the two prehistoric sites. Although the two sites are somewhat different, they both possess characteristics which suggest there may be more to the site than was recorded for the Phase I survey. Site 7NC-G-103 consists of a tight cluster of fire-cracked rock and tools at the crest of a prominent rise and site 7NC-G-104 produced tools from plowed contexts and flakes from a wooded, historically unplowed section of the site. The potential integrity of site 7NC-G-104 is higher due to the unplowed nature of a segment of the site. Phase II work is recommended for these two prehistoric site loci.

PARCEL 9 - WRANGLE HILL SOUTH FIELD

Figures 14 and 15 illustrate the Proposed Right-of-Way and the shovel testing conducted in this parcel. The Proposed Alignment includes the main trunk of the road and two access

FIGURE 15

Map of Parcels 9(partial)-12, 14partial), and 23(partial): STAs 1940-2005



ramps to Route 72 - Wrangle Hill Road (New Castle 356). This parcel begins at the point where the Proposed Right-of-Way crosses an ephemeral tributary of Dragon Creek and extends 1450 feet north to Route 72. At a point of intersection with the Proposed Right-of-Way, the tributary is joined by another deeply incised ephemeral drainage. The tributary extends northwest from this point while the other drainage extends to the northeast, thus defining the natural topography of this parcel.

Survey methods on this parcel consisted of shovel testing and a limited pedestrian survey. Surface visibility was limited by overgrown no-till corn stubble. A total of four areas were shovel tested (Figures 14 and 15), and one prehistoric artifact location was identified.

The most southerly area shovel-tested (Shovel Test Pits 36-47) identified the Wrangle Hill South Prehistoric Site, 7NC-G-105. This site is located downslope on a toe/terrace above the confluence of two ephemeral drainages. Artifacts recovered from the shovel testing consisted of two argillite flakes, one quartz flake, one chert flake, two quartzite flakes, and one jasper flake, all from the plowzone. All of these artifacts came from just three shovel test pits: nos. 36, 37, and 39. One argillite flake was collected from the surface near Shovel Test Pit 40. These artifacts and their location on low order streams suggest a procurement site. Soil stratigraphy exhibited a plowzone consisting of brown silty clay overlying an orange brown to red brown silty or sandy clay with some small gravels. The artifacts are tightly clustered at the toe of the slope and the total count

of artifacts is high when one considers the limit amount of excavation conducted (1x1 foot shovel test pits on a grid at 40' intervals is a 0.06 percent sample). Although the site may be limited to the plowzone, Phase II work is recommended on this site. Shovel Tests 25-29 were excavated near the ephemeral tributary. Shovel Test 26 produced two fire-cracked rock and one jasper flake. Shovel Tests 20-24A were excavated on a small rise in the northwest portion of the parcel and produced one redware and one brick fragment. Shovel Tests 1-19 were excavated on a bluff edge overlooking the deeply incised ephemeral drainage and produced one redware fragment. Soil stratigraphy for Shovel Tests 1-29 generally consisted of a plowzone of brown clayey loam with gravels overlying an orange to red-brown sandy loam with gravels. Soils were heavily eroded and deflated in the northern two-thirds of the parcel, and other than for site 7NC-G-105, no further work is recommended.

PARCEL 10 - WRANGLE HILL NORTH FIELD

Parcel 10 begins at Route 72 and extends north 1450 feet to a windrow separating two cultivated fields (Figure 15). The alignment consists of the main trunk of the Proposed Right-of-Way and two access ramps to Route 72. Because surface visibility was excellent, a pedestrian survey was conducted to locate artifacts. The surface was eroded and deflated in some areas and criss-crossed by two ephemeral drainages. One piece of fire-cracked rock was observed, and no further work is recommended on this parcel.

PARCEL 11 - CONRAIL SOUTH FIELD

Figure 15 illustrates this 2700 foot portion of the Proposed Right-of-Way, which extends north from a windrow to the Conrail railroad tracks. Survey methods consisted of a pedestrian survey over five-sixths of this parcel and shovel testing on the northern one-sixth of this parcel. Surface visibility was excellent in those areas subjected to pedestrian survey.

The pedestrian survey conducted on the southern end of the parcel identified two areas of prehistoric artifacts. The first area is the Conrail South A Prehistoric Site, 7NC-E-93, which is located on a low knoll bounded by a series of ephemeral drainages. This site is located at the southern end of the parcel and extends north 700 feet to an ephemeral drainage. Artifacts collected consisted of one quartzite flake, one quartzite teardrop Woodland I projectile point fragment, one quartzite stemmed Woodland I projectile point fragment, and one jasper expanding stem Woodland I projectile point fragment resembling a fishtail point. In addition, nine fire-cracked and one jasper flake were observed. The large number of tools present on the site suggests a procurement site and Phase II work is recommended for this site.

The Conrail South B Prehistoric Site, 7NC-E-92, is situated on the northeasterly slope of a knoll and is surrounded by ephemeral drainages. The site extends northward about 700 feet from the ephemeral drainage dividing 7NC-E-92 from 7NC-E-93. Artifacts collected consisted of one chert flake and one quartz core, while six fire-cracked were observed. Because the site

appears to be extremely thin, no further work is recommended for this site.

Shovel Test Pits 1-22 were excavated near the Conrail crossing at the northern end of the parcel and produced only a few historic artifacts. Soils were eroded and those shovel tests excavated near the railroad tracks exhibited disturbed contexts. The realignment in the Proposed Right-of-Way begins south of the railroad tracks, and this shift was pedestrian surveyed due to improved visibility within this new section of Proposed Right-of-Way. Historical background research indicated a structure believed to be an agricultural tenancy (Custer, Jehle, Klatka, and Eveleigh 1984) at the intersection of Route 13 and the railroad tracks (Baist 1893, Figure 8). No historic artifacts or architectural debris were identified in this area. Road and/or railroad improvements probably destroyed any archaeological remains pertaining to this structure. Assorted historic artifacts were observed as a thin field scatter throughout the parcel. No historic artifact concentrations were observed.

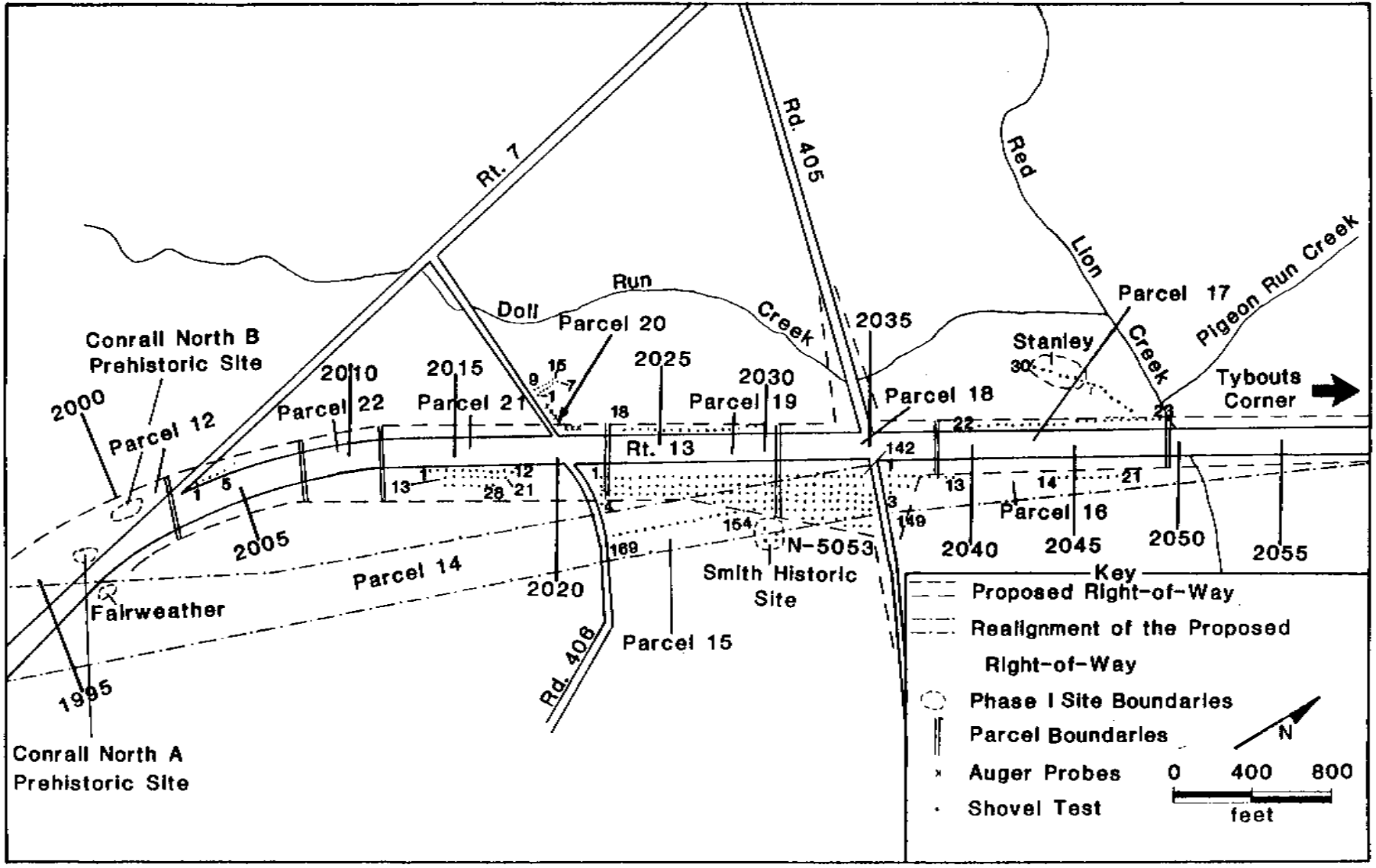
Figure 15 illustrates the old and newly Proposed Alignments within this parcel and both alignments were subjected to a cultural resource survey. The original Proposed Alignment follows the trunk of existing Route 13 and includes a proposed access road which would parallel the main trunk of the road.

PARCEL 12 - CONRAIL NORTH FIELD

Figures 15 and 16 illustrate the Proposed Right-of-Way including the shift in the alignment in this parcel and the

FIGURE 16

Map of Parcels 12(partial), 14-23: STAs 1995-2055



artifact scatter locations. The length of this parcel is 1200 feet and extends from the Conrail railroad tracks to the present intersection of Route 7 and Route 13. Since surface visibility was excellent, the survey method consisted of a pedestrian survey which identified two areas of prehistoric artifacts, 7NC-E-94 (Conrail North A) and 7NC-E-95 (Conrail North B).

The Conrail North A Prehistoric Site, 7NC-E-94, is located on a small northeast-southwest trending knoll bisected by Route 13. It lies next to an ephemeral drainage adjacent to Route 13 and approximately 800 feet north of the railroad tracks. Prehistoric artifacts were also identified on the remaining portion of the knoll on the northeast side of Route 13 (labelled 7NC-E-96) and may represent an extension of this site. Artifacts identified from site 7NC-E-94 consisted of a quartz late stage biface reject and three fire-cracked rocks.

The Conrail North B Prehistoric Site, 7NC-E-95, is located on a gentle slope approximately 300 feet north-northeast of the 7NC-C-94 site. Artifacts identified included one quartz stemmed Woodland I projectile point fragment (collected), one quartz flake, and four fire-cracked rock. Because the site appears to be so thin, no further work is recommended.

The alignment, as originally proposed, followed existing Route 13 from the present intersection of Route 7 and Route 13 to the north end of the Project Area. A shift in the alignment has moved the Proposed Right-of-Way to the east of existing Route 13. Both 7NC-E-94 and 7NC-E-95 were going to be impacted with the original Proposed Alignment. However, with the alignment shift, these sites are no longer going to be impacted. The western edge

of the new Proposed Alignment appears to be located adjacent to the preliminary site boundaries established for the 7NC-E-94 site. No further work is recommended for this parcel because no artifacts were found in good context.

Parcels 17 through 23 (north to south) are located on the west side of existing Route 13 and are no longer part of the Proposed Alignment due to its shift to the east. These parcels were surveyed as part of the original survey based on the initial Proposed Right-of-Way. A brief discussion of these parcels is presented, even though impact due to road construction is no longer a threat. No further work is recommended at this time. The following discussion of these parcels is presented in the usual south to north progression.

PARCEL 23 - FAIRWEATHER MARINE YARD

Parcel 23 is a triangle of land located at the intersection of existing Route 7 and Route 13 (Figures 15 and 16). A total of four shovel tests were excavated. Shovel Test Pit 2 had a brown silty clay plowzone overlying a yellow brown silty clay. The remaining shovel tests showed evidence of severe disturbance, including stripping of the plowzone, highly compacted subsoils, buried blacktop, and other materials. No further work is recommended.

PARCEL 22 - HEMPHILL YARD

Parcel 22 is 300 feet in length and was subjected to shovel testing within the Right-of-Way (Figure 16). A total of six shovel tests were excavated. Soils consisted of unplowed, intact

fine brown sands overlying yellow brown sandy subsoil with some pebbles. All shovel test pits were culturally sterile. No further work is recommended.

PARCEL 21 - NIBLETT FIELD

Figure 16 illustrates this 950 foot portion of the Proposed Alignment. Historic atlases (Beers 1868, Figure 7; Baist 1893, Figure 8) indicate a structure was located on the southwest corner of the intersection of Route 13 and New Castle 406. Access onto the parcel was delayed due to the harvesting of a wheat crop. A pedestrian survey along the east edge of the field in the vicinity of the intersection failed to identify any cultural materials. The shift in the Proposed Alignment negated any further work on this parcel. However, if future DelDOT right-of-way proposals affect this intersection, then a Phase I excavation program of this field should be undertaken.

PARCEL 20 - BLASCHKO WOODLOT AND YARD

Field survey methods for this parcel consisted of auger probing as well as shovel testing (Figure 16). Two areas within this parcel were examined. The first area was that portion of the 350 foot Right-of-Way adjacent to Route 13. The second was a woodlot adjacent to a proposed cul-de-sac on New Castle 406. Historic atlases (Beers 1868, Figure 7; Baist 1893, Figure 8) indicate that two structures were present on the north side of the intersection of Route 13 and New Castle 406. Presently, a metalworking shop, Hickory Metal Specialties, is located northwest of the intersection. Informant interviews with the shop owner, Mr. Blaschko, indicated that large portions of the

yard had been disturbed when a well, a septic system, and an underground geothermal heating system were installed on the premises. Auger testing confirmed the disturbances and indicated the area of interest has been modified entirely. Shovel testing in the woodlot north of and adjacent to the proposed cul-de-sac produced a few whiteware and redware fragments, one pearlware fragment, many fragments of unidentifiable melted glass, nails, and miscellaneous metal fragments. No intact structural remains were located. The artifacts recovered date to the late 19th and early 20th century and the majority were burned. Soil stratigraphy in the shovel test pits consisted of a brown silty clay overlying yellow brown to orange brown sandy subsoils. Because all of the artifacts appeared to have come from a thin sheet midden associated with burn piles and were not associated with any intact subsurface features, no further work is recommended for this parcel.

PARCEL 19 - STATE OF DELAWARE WOODLOT

Figure 16 illustrates the shovel testing conducted on this parcel. Located in this 775 foot parcel are two large borrow pits. Shovel testing was restricted to the Proposed Right-of-Way and shovel test pits were placed between Route 13 and the borrow pits. A total of 18 shovel test pits were excavated. One redware fragment was recovered. Soil stratigraphy exhibited plowzones, disturbed plowzones, and non-plowed profiles. Plowzones, when present, consisted of brown sandy loams. Subsoils consisted of orange brown or yellow brown sandy clays with gravels and some of the subsoils were very compacted. No

artifacts in good context were recovered from any of the shovel test pits excavated in this parcel and no further work is recommended.

PARCEL 18 - LESKI WOODLOT

Figure 16 illustrates the location of this 800 foot parcel. Access was denied by the owner. However, a roadside visual inspection and map reconnaissance revealed the parcel was largely Doll Run floodplain with a gentle rise of dry ground in the south end of the parcel. Strong potential exists for locating buried prehistoric cultural materials on the aforementioned gentle rise and should the Proposed Right-of-Way be shifted back into the Leski property, then Phase I investigation would be recommended.

PARCEL 17 - STANLEY WOODLOT

Figure 16 illustrates Parcel 17 and the shovel testing conducted on this parcel. This parcel extends from a property boundary north 1250 feet to Red Lion Creek. Doll Run, a small tributary of Red Lion Creek, is located approximately 350 feet west of existing Route 13 and flows roughly parallel to the highway.

A total of 22 shovel test pits were excavated within the Proposed Right-of-Way. The majority of these shovel test pits contained no cultural materials. Artifacts recovered from the few non-sterile holes consisted of modern glass fragments, brick, miscellaneous metal, one late 19th century fragment of ironstone (Decalcomania transfer-printed), and one fire-cracked rock (Shovel Test Pit 20). A variety of soil profiles were present,

including brown silty clays overlying gray silty clays and mottled orange yellow and gray silty clays (road fill) overlying compacted gray clays. Shovel Test Pits 13, 14, and 20 had soil profiles exhibiting a fill layer overlying old plowzone soils. Property owners at the south end of the parcel mentioned that substantial amounts of fill had been brought in for their homes to raise the land surface above the Doll Run floodplain. Shovel Test 22 was abandoned due to driveway fill.

An additional transect of shovel test pits was excavated following a low bluff/terrace edge along Red Lion Creek and Doll Run. A total of 16 shovel test pits (Nos. 23 to 38) were excavated which resulted in the identification of the Stanley Prehistoric Site, 7NC-E-97. Shovel Test Pit 32 produced two fire-cracked rock, Shovel Test Pit 33 produced one quartz flake and one chert core, and Shovel Test Pit 38 produced one quartzite flake. Shovel Test 37 recovered one chert core, a quartz flake, and one large ironstone non-diagnostic tool that had been bifacially worked on only the edges. In addition, Shovel Test Pit 37 uncovered in situ fire-cracked rock comprising a hearth associated with the above mentioned artifacts. No carbon was identified and only a few pieces of fire-cracked rock from the hearth were collected. Soil stratigraphy on Shovel Test Pit 37 consisted of a thin humus overlying a yellow brown silty clay. Excavation was halted in this shovel test pit when the hearth was encountered. Because site 7NC-E-97 is located just outside the original Proposed Right-of-Way, no further work is recommended at this time. However, should the Proposed Right-of-Way be shifted back onto this property, the Right-of-Way would have to be re-

examined to evaluate its impact on the Stanley Site.

PARCEL 14 - TEXACO FIELD AND WOODLOT

This portion of the shifted Proposed Right-of-Way is 2800 feet in length and begins just south of the existing intersection of Route 7 and Route 13 and extends north to New Castle 406. Surface visibility was good during the pedestrian survey of the originally Proposed Alignment. A small prehistoric site, 7NC-E-96 (Fairweather Site), was identified on knoll which is probably an extension of the knoll in Parcel 12 which contained 7NC-E-94, another small prehistoric site. Artifacts collected consisted of two utilized flakes, one of quartz and one of chert. The few numbers of artifacts identified from the site preclude the need for further work and no Phase II excavation is recommended.

A total of 28 shovel test pits were excavated in a wooded section of the original alignment adjacent to Route 13 (Figure 16). This woodlot contained 20th century artifacts including some intact cinder block and concrete floor architectural remains. Artifacts recovered from the shovel test pits included whiteware and window glass fragments. A chert flake was recovered in Shovel Test Pit 5 from a layer of fill. An historic archival search of early atlases, maps, and other materials produced no indication of any early historic structures. In fact, an abrupt change in land elevation is noted along the southern edge of the woodlot and suggests this area was used for borrow. No further work is recommended for this site. In addition, a realignment of the Proposed Right-of-Way no longer impacts this woodlot.

A survey of the remainder of the old Proposed Alignment produced two isolated finds, each consisting of one piece of fire-cracked rock. A pedestrian survey of the realignment of the Proposed Right-of-Way identified additional prehistoric artifacts. Surface visibility was limited, less than 50 percent, but adequate enough to properly investigate this parcel. One chert biface and one chert flake were collected from an eroded knoll located approximately 500-600 feet south of New Castle 406. The chert biface is a bifacially worked flake which could have been used as a scraper or a knife, although it lacks evidence of use-wear. No further work is recommended here due to the very low numbers of artifacts and the eroded soil conditions.

PARCEL 15 - SMITH WOODLOT

Figure 16 illustrates the Proposed Right-of-Way and its realignment and includes the extensive shovel testing conducted on this parcel. Parcel 15 is defined by New Castle 405 and 406 and is 1500 feet in length. The original Proposed Alignment included the main trunk of existing Route 13 and a continuation of the access road from Parcel 14 which joins New Castle 405. The realignment of the Proposed Right-of-Way consists only of the main trunk of the proposed Route 13. The original Proposed Right-of-Way was quite wide to accommodate the access road and was subjected to extensive shovel testing.

Shovel testing within the original Proposed Right-of-Way produced very few cultural materials. Artifact types included whiteware, assorted glass fragments, nails, and brick. A few stoneware and redware fragments were also collected. An

unidentifiable feature was encountered in Shovel Test Pit 12. This consisted of a homogenous brown sandy soil with a few carbon flecks capped by a thin yellow sandy clay fill layer. This feature will no longer be impacted due to the realignment. Shovel testing within the realignment of the Proposed Right-of-Way was restricted to the centerline due to the relatively few artifacts collected from the above mentioned shovel testing. One quartz flake was recovered from the plowzone in Shovel Test Pit 167.

A previously recorded historic archaeological site (CRS# N-5053, site 7NC-E-98) was located at the northern end of the parcel and included brick and architectural remains (Plate 1). A series of three photographs taken by the Bureau of Archaeology and Historic Preservation in March, 1979 show a dilapidated, two-story, 4-bay frame structure with a low hipped roof and a two-story, 2-bay frame wing on the west end (Plates 2 through 4). The chimneys are located on the east and west ends. Two story porches were located on both the north and south elevations. Apparently the structure was razed shortly after that date. The open stone foundation and the two chimney piles are all that remain and the entire site is now heavily overgrown with grasses, vines, and shrubs. This site is believed to be a pre-1849 agricultural complex (Custer, Jehle, Klatka, and Eveleigh 1984) and has been labelled the Smith site. The east edge of the original proposed new alignment came within 75 feet of the structural remains and the proposed shift in the alignment brings the east edge of the Right-of-Way to within 12 feet of the

PLATE 1

Architectural Remains from Parcel 15,

U.S. 13 Relief Route, Phase I Survey

PLATE 2

7NC-E-98, N-5053, South Elevation;

Structure Razed about 1980

PLATE 3

7NC-E-98, N-5053, South Elevation;

Structure Razed about 1980

PLATE 4

7NC-E-98, N-5053, North Elevation;

Structure Razed about 1980

open house foundation. Artifact counts increased slightly in those shovel test pits excavated closer to the architectural remains, and the highest number of artifacts came from the five shovel test pits located around these remains. Artifacts recovered from these shovel tests included whiteware, redware, and stoneware fragments, bottle and window glass, brick, nails, and other materials. All of the recovered artifacts seem to post-date 1840.

Soil stratigraphy exhibited by the shovel testing consisted of brown sandy or silty plowzones overlying orange brown sands with gravels, orange brown to yellow brown silty clays, or orange brown silty sands with gravels. Shovel tests excavated around the structural remains exhibited a thin humus layer overlying brown silty clay plowzone. Below this plowzone, soils consisted of orange brown to yellow brown compacted silty clays. Phase II work is recommended for this site to locate and identify archaeological features associated with the structural remains.

PARCEL 16 - RED LION CREEK FIELD AND WOODLOT

Parcel 16 was subjected to both pedestrian survey and shovel testing. This parcel extends from New Castle 405 to Red Lion Creek (Figure 16). The realignment of the Proposed Right-of-Way merges with existing Route 13 in this parcel. The Right-of-Way consists of the main trunk of the proposed Route 13 and is 1500 feet in length.

The pedestrian survey was conducted in a cultivated field adjacent to a narrow woodlot and an overgrown fallow field. Surface visibility was moderate. A total of 21 shovel test pits

were excavated in the poor visibility areas. The pedestrian survey combined with the shovel testing produced three quartz artifacts, all of which came from the plowzone. One of the pieces of quartz has no cortex but resembles a medial section of an early stage biface reject. Soil stratigraphy in the shovel tests consisted of a brown silty or sandy clay plowzone overlying orange or yellow brown clayey sands with gravels. The northern end of this parcel has been disturbed by electrical transmission towers and an electrical transformer site. Based on the low numbers of artifacts found throughout the parcel and their plowzone locations, no further work is recommended.

INTERPRETATIONS AND CONCLUSIONS

This section of the report will summarize the cultural resources recovered during the Phase I survey of the Chesapeake and Delaware section, Odessa Segment, of the proposed Relief Route. Table 2 lists the findings by parcel number and survey station number and Figure 17 shows the sites found during the Phase I survey.

IMPLICATIONS FOR REGIONAL ARCHAEOLOGY

The Phase I archaeological survey of this segment of the proposed Route 13 Relief Route identified only one historic archaeological site and twelve prehistoric archaeological sites. The locations of the all sites identified by the survey can be studied for meaningful insights.

The single historic farmstead identified in the survey, 7NC-E-98, will likely address only one of the historic themes identified previously. The site apparently dates to the second

TABLE 2

CULTURAL RESOURCE LOCATIONS WITHIN THE PROPOSED U.S. 13 RELIEF ROUTE RIGHT-OF-WAY WHERE PHASE II TESTING IS RECOMMENDED, SCOTT'S RUN CREEK - RED LION CREEK

Cultural Resource	Figure Number	Parcel/Name	STA
1) Parkway Gravel Prehistoric Site	12	1) Parkway Gravel Field and Woodlot	1785
2) Snapp Prehistoric Site	12	3) Snapp Field	1825
3) Weaver Prehistoric Site	13	5) Weaver Field and Woodlot	1875
4) Dragon Run North A Prehistoric Site	14	8) Dragon Run North Field and Woodlot	1920
5) Dragon Run North B Prehistoric Site	14	8) Dragon Run North Field and Woodlot	1927
6) Wrangle Hill South Prehistoric Site	14, 15	9) Wrangle Hill South Field	1946
7A) Conrail South A Prehistoric Site	15	11) Conrail South Field	1972
7B) Conrail South B Prehistoric Site	15	11) Conrail South Field	1978
8) Smith Historic Site (N-5053)	16	15) Smith Woodlot	2032

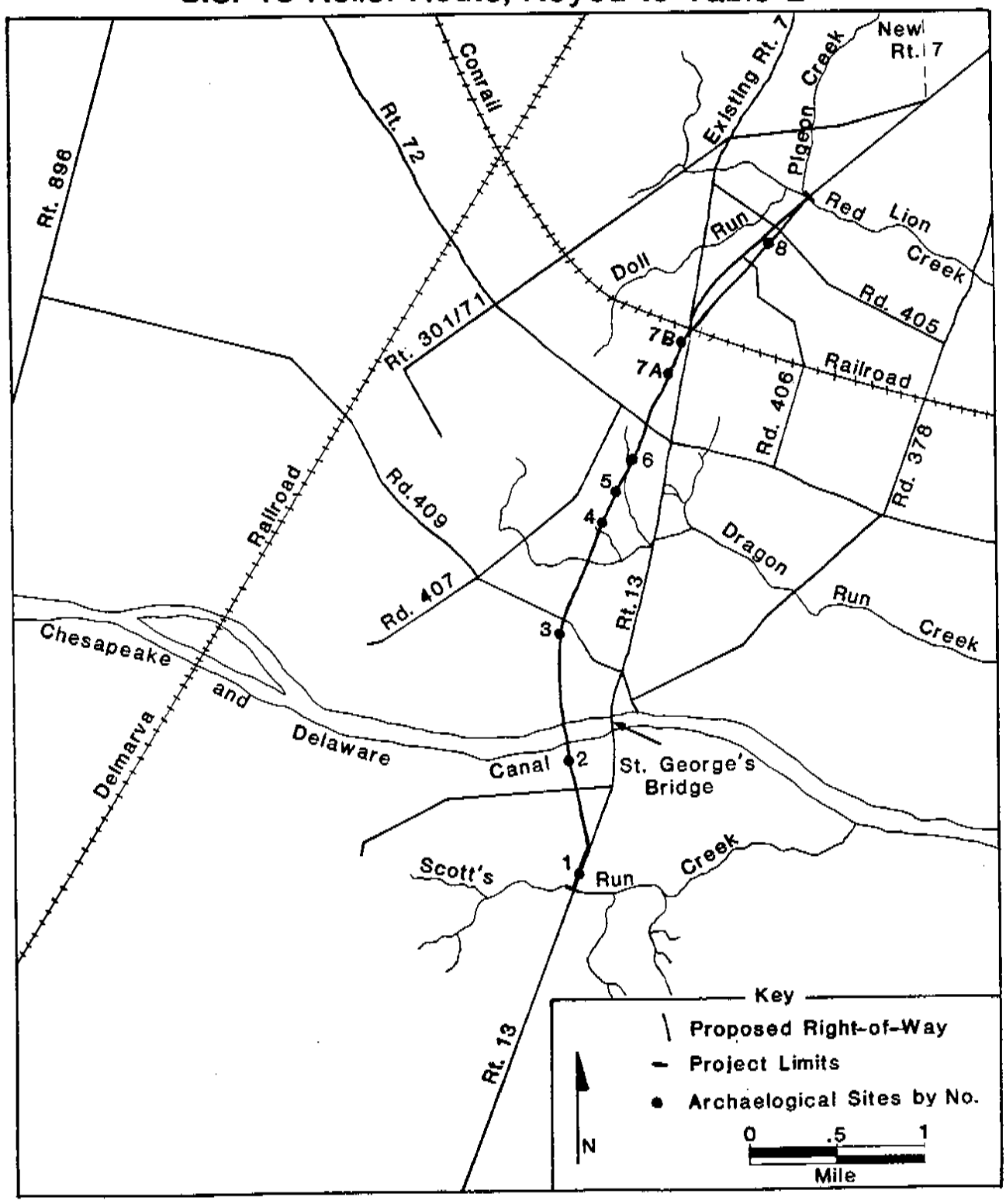
Key:

STA = Department of Transportation Centerline Station Numbers

quarter of the 19th century and the period between 1820 and 1840 is a time of agricultural reform on the Delmarva Peninsula. Advances in agricultural practices meant changes in yields and farm sizes. Overpopulation meant there was too little available arable land and many people left the county and moved to western states. Finally, Herman (1987:128) has documented a period of rebuilding in the county for the period from 1830 to 1860 whereby

FIGURE 17

Archaeological Sites Requiring Phase II Work, Phase I Survey of the Chesapeake and Delaware Canal Section, Odessa Segment, U.S. 13 Relief Route, Keyed to Table 2



many 17th and 18th century farmhouses underwent major alterations or were torn down and replaced with modern structures. This dwelling house may represent that rebuilding. However, there are no earlier deposits in the archeological record from the site, so an earlier farmhouse site, if one existed, may lie somewhere else on the property. In any event, it is likely that an archival and archaeological investigation of the property would yield a detailed record of the lifeways of the inhabitants, the placement of the farm in the local market economy, the reason for the selection of the site for a residence (settlement pattern), and agricultural practices for the time and their effect on the lifestyle of the inhabitants.

The results of the Phase I survey can also be used to test the predictive model for prehistoric sites developed in the original Route 13 cultural resource planning survey (Custer, Jehle, Klatka, and Eveleigh 1984). Preliminary tests using the results of the two planning surveys (Custer and Bachman 1986:117-120; Custer, Bachman, and Grettler 1986:172-175) showed that the predictive model worked with a high degree of accuracy; however, additional tests are always useful. Unfortunately, the area covered by this survey was not large enough to allow the application of the kinds of statistical tests used in earlier evaluations of the predictive model. Also, the predictive model was not applied to the northernmost end of the current project area (see Custer, Jehle, Klatka, and Eveleigh 1984, Vol. II:124). Nonetheless, the general findings of the survey can be compared to the model's predictions on an impressionistic basis.

Figure 18 shows the location of the prehistoric sites found during the survey and these locations can be compared to Figure 4, which shows the predicted site locations. Six of the twelve prehistoric sites (7NC-G-100, 7NC-G-103, 7NC-G-104, 7NC-G-102, 7NC-G-105, and 7NC-E-97) are located in, or adjacent to, predicted locations. The remaining six sites (7NC-G-101, 7NC-E-92 through 7NC-E-96) that are not located in the area of anticipated site locations, are found in interior areas and are indicative of the previously noted Woodland I use of interior areas on an ephemeral basis. Similar sites were identified in similar High Coastal Plain settings during the surveys of the Route 896 Corridor (Lothrop, Custer, and DeSantis 1987) and the Route 7 South Corridor (Catts, Rappleye-Marsett, Custer, Cunningham, and Hodny 1988), two completed studies of other archaeological sites in the vicinity of the above Route 13 Corridor Project Area.

In general, the site locations noted in this study confirm the interpretations of interior procurement sites during Woodland I times noted in the Route 7 South Corridor (Catts et al. 1988:196-200) and in the Management Plan for Delaware's Prehistoric Cultural Resources (Custer 1986). For the most part, Woodland I settlement focused on major drainages. From these base camps, there were forays to specific resource settings for the focused procurement of specific resources and these forays produced discrete archaeological sites. At the same time, more generalized forays took place and these less well focused forays tended to produce more scattered, less discrete sites. The less discrete sites are the generalized lithic scatters which make up

FIGURE 18

Prehistoric Site Locations

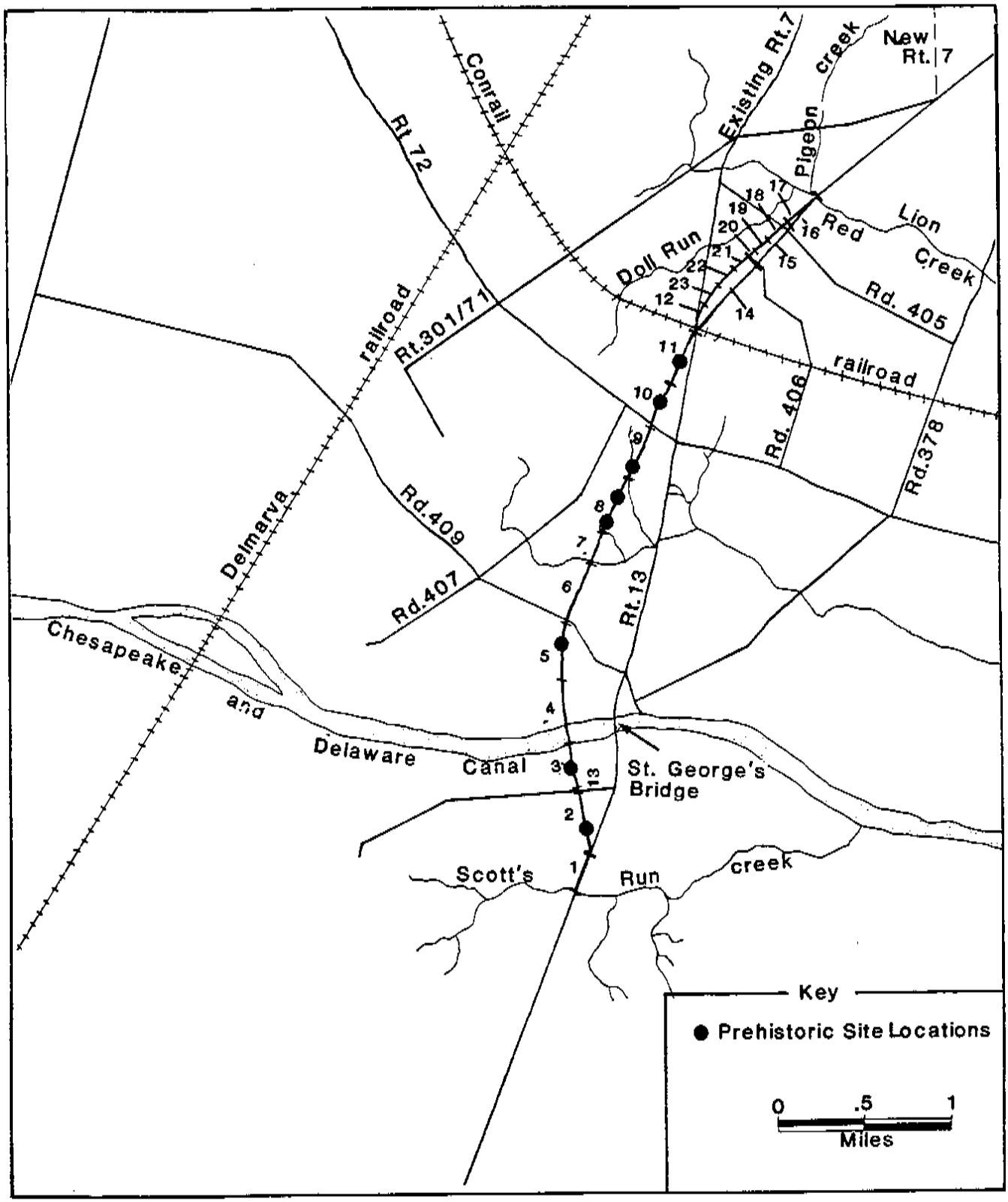
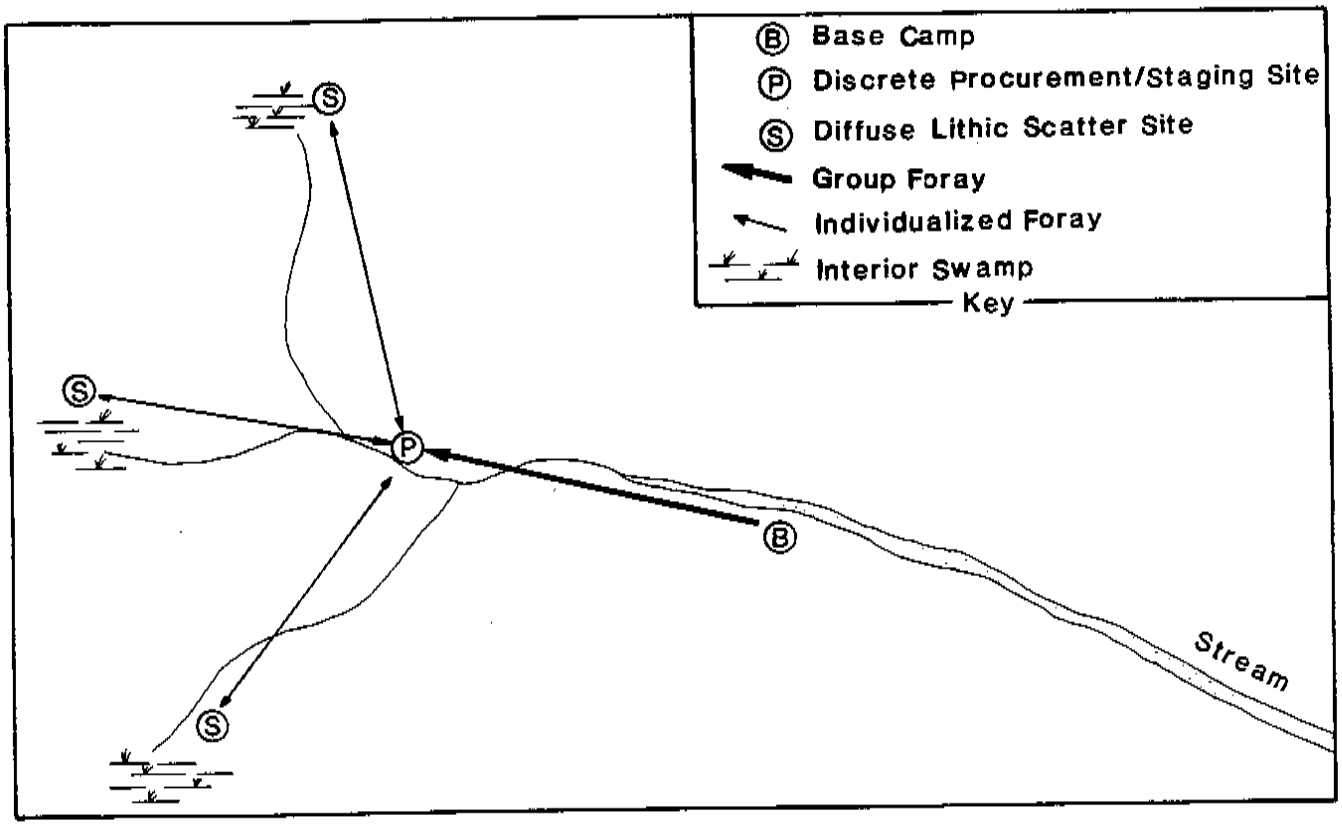


FIGURE 19

Staging Camp Scenario

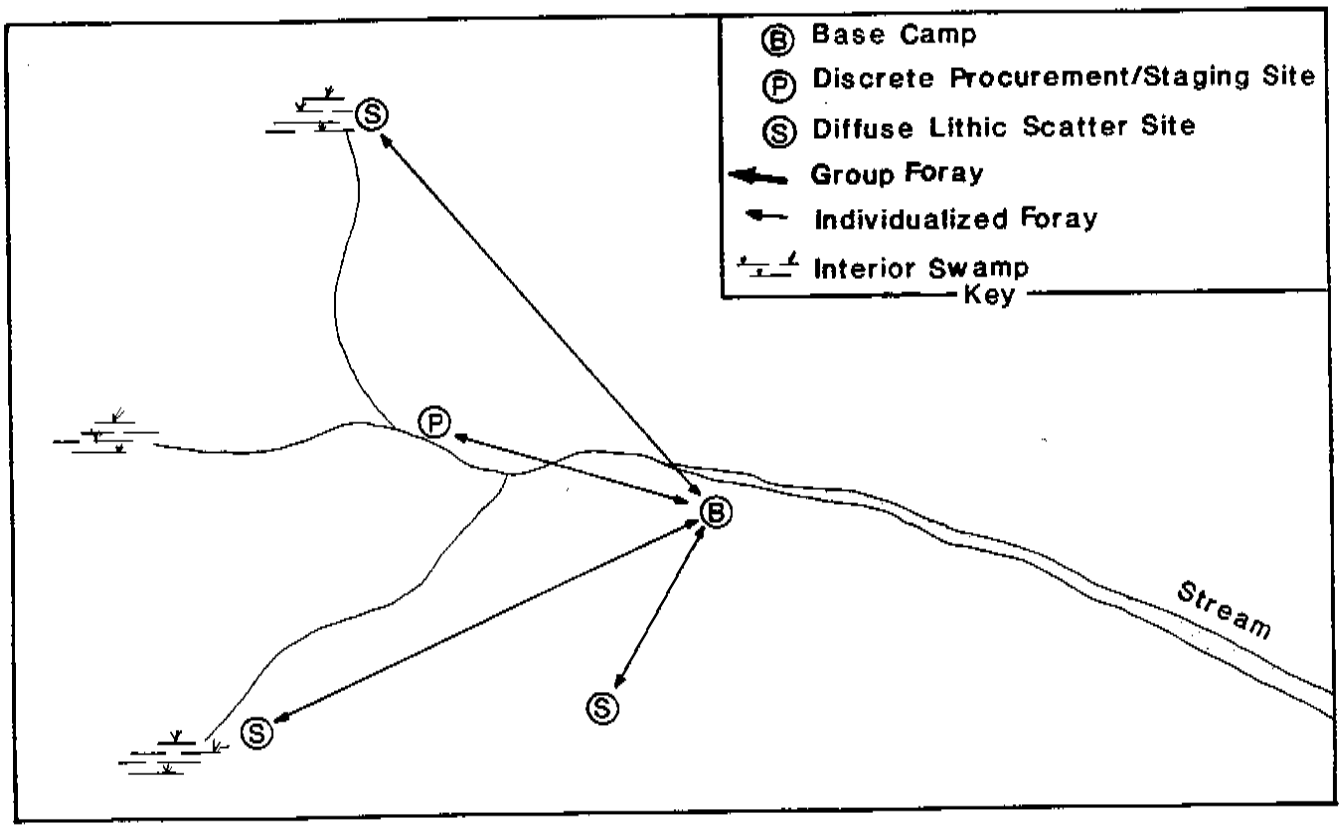


a large part of the sites reported from this survey. This two part definition for the generation of procurement sites in the project area is an expansion of that definition given in the management plan, which states only that procurement sites are the result of the exploitation of specific resource locations. Both types of interior sites were identified during the Route 13 Canal Section survey.

Further study of both types of interior sites is needed to better understand the organization of the resource procurement process. It may be possible that the discrete interior sites are small staging sites from which individualized forays to very transient procurement sites, which produced the lithic scatter

FIGURE 20

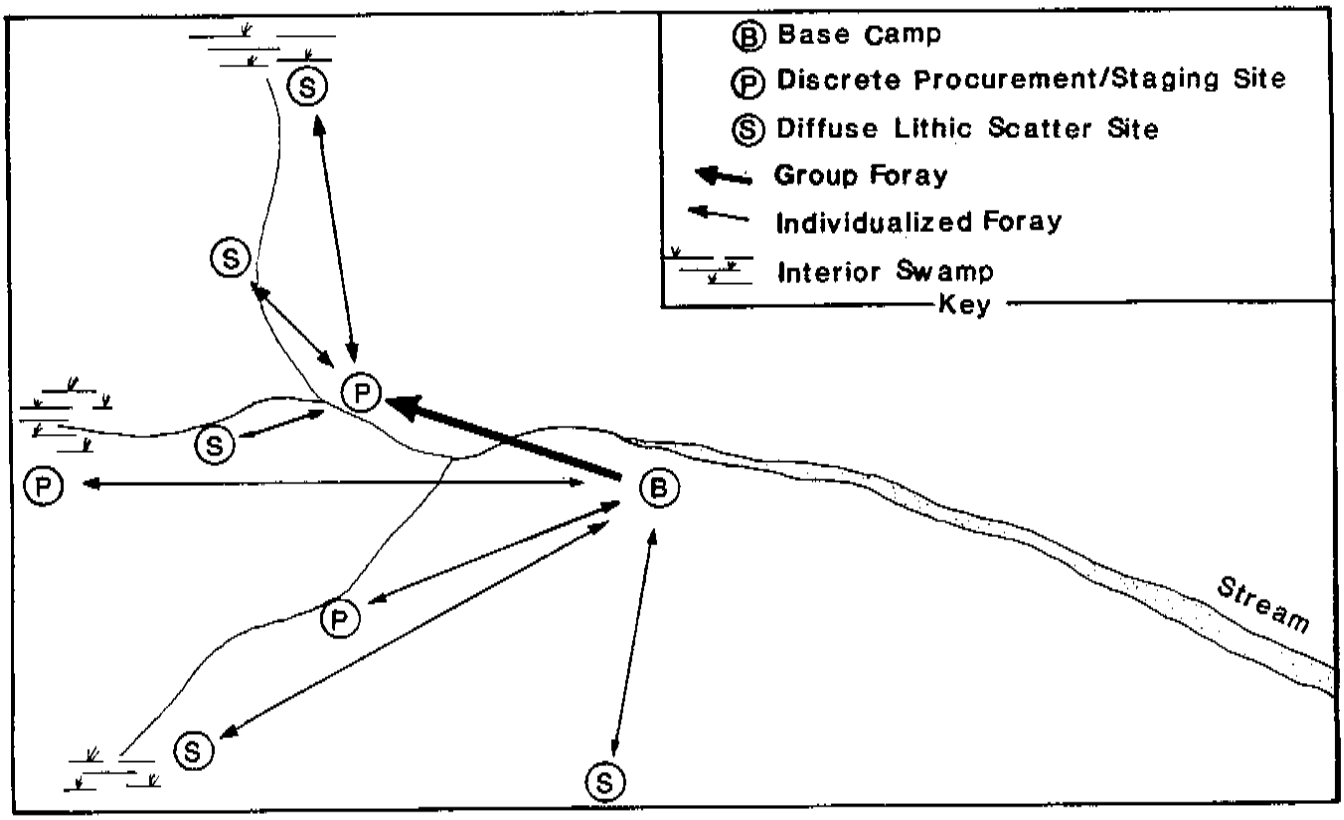
Individualized Foray Scenario



sites, were made. Figure 19 illustrates this land/use scenario. An alternative scenario (Figure 20) would explain the variation in interior sites as a function of the length of time spent in the associated procurement activities. The discrete sites would represent focused, relatively long term procurement activities while the more scattered diffuse sites would have been produced by a large number of very short term individual procurement events. It is also possible that both of the scenarios noted in Figures 19 and 20 operated together in the same settlement system (Figure 21). Similar variability in settlement patterns has been described for the initial Woodland I time period in the central Middle Atlantic (Custer 1988:45-46) and has been noted from the

FIGURE 21

Combined Settlement Scenario



ethnographic record (Binford 1982). In any event, data quality is poor for both the Delaware River Shore and the Interior zones, the two Management Plan Woodland I study units in which the project area is contained, and further investigation of the procurement sites noted in this report should help to clarify the issue.

CULTURAL RESOURCE MANAGEMENT RECOMMENDATIONS

The Phase I survey of the Chesapeake and Delaware Canal section, Odessa Segment, of the U.S. 13 Relief Route identified the location of 13 archaeological sites, and Phase II testing is recommended at 10 of these (7NC-G-100 through 7NC-G-105, 7NC-E-

93, 7NC-E-94, 7NC-E-97, and 7NC-E-98). These site categories (Appendix II) are consistent with the guidelines developed in the Route 13 Phase I/II Reserach Plan (Custer, Bachman, and Grettler 1987). For the purpose of identifying the necessary levels of Phase II research at the varied archaeological sites and for categorizing significance, four major categories of sites were identified (Table 3 and Appendix II).

For each of the sites where additional work is recommended, avoidance of the site is the recommended prudent alternative. If avoidance is not possible, then the site-specific recommended archaeological testing program should be implemented. As per National Park Service guidelines for a site's National Register determination of eligibility, the Phase II testing program will include the delineation of the sites areal limits. It should also be noted that if any other Proposed Rights-of-Way are placed in areas which have not been tested, then Phase I survey will be required for those sections.

In conclusion, the Phase I survey of the Chesapeake and Delaware Canal section, Odessa Segment, of the U.S. 13 Relief Route has identified ten archaeological sites for which Phase II testing is recommended and this research will add much to our knowledge of the archaeology of New Castle County and the Delaware Upper Coastal Plain.

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APPENDIX I

ARTIFACT CATALOG

PREHISTORIC ARTIFACT TOTALS

	Parkway Gravel 7NC-G-100	Snapp Field 7NC-G-101	Weaver 7NC-G-102	Lester	Dragon Run South
FLAKES (CORTEX)					
Quartz	1(1)	--	--	2	--
Chert	--	--	--	1	--
Jasper	2	--	--	1	--
UTIL. FLAKES (COR.)					
Quartzite	--	--	4	--	--
Chert	1(1)	--	--	--	--
WOODLAND I POINTS					
Chert	1	--	--	1	--
Jasper	--	--	--	--	1
ESBR					
Quartz	--	1(1)	--	--	--
LSBR					
Quartz	1	--	--	--	--
OTHER BIFACES					
Quartzite	--	--	1	--	--
MISC. STONE TOOLS					
Quartzite	--	--	1	--	--
Hammerstone	--	1	--	--	--
CORES					
Quartz	1	--	--	--	--
Chert	2	1(1)	1	--	--
FCR	51	200	--	--	--
TOTAL	60(2)	203(2)	7	5	1

KEY:

util. - utilized
cor. - cortex
ESBR - early stage biface reject
LSBR - late stage biface reject
Misc. - miscellaneous
FCR - fire-cracked rock

	Dragon Run North A 7NC-G-103	Dragon Run North B 7NC-G-104	Wrangle Hill 7NC-G-105	Conrail South A 7NC-E-93
FLAKES (CORTEX)				
Quartzite	--	--	2	1
Quartz	2	4	1	--
Chert	--	1	1	--
Jasper	--	--	2(2)	1
Argillite	--	--	3	--
Ironstone	--	3(2)	--	--
WOODLAND I POINTS				
Quartzite	--	--	--	2
Jasper	--	--	--	1
ESBR				
Quartz	--	1	--	--
MISC. STONE TOOLS				
Anvil Stone	1	--	--	--
SHATTER				
Jasper	--	1(1)	--	--
CORES				
Quartz	2	--	--	--
FCR	5	3	2	9
TOTAL	7	13(3)	11(2)	14

	Conrail South B 7NC-E-92	Conrail North A 7NC-E-94	Conrail North B 7NC-E-95	Snapp Home	Fairweather 7NC-E-96
FLAKES (CORTEX)					
Quartz	--	--	1	--	--
Chert	1(1)	--	--	--	1(1)
UTIL. FLAKES (COR.)					
Quartzite	--	--	--	--	1
Chert	--	--	--	--	1
WOODLAND I POINTS					
Quartz	--	--	1	--	--
LSBR					
Quartz	--	1	--	--	--
OTHER BIFACES					
Chert	--	--	--	--	1
Jasper	--	--	--	1	--
CORES					
Quartz	1(1)	--	--	--	--
FCR	6	3	4	--	--
TOTAL	8(2)	4	6	1	4(1)

	Smith 7NC-E-98	Red Lion Creek	Stanley 7NC-E-97	Blaschko
FLAKES (CORTEX)				
Quartzite	--	--	1	--
Quartz	1	--	2	--
Jasper	--	--	--	1
OTHER BIFACES				
Ironstone	--	--	1	--
SHATTER				
Quartz	--	3	--	--
CORES				
Chert	--	--	2	--
FCR	--	--	6	--
HEARTH	--	--	1	--
TOTAL	1	3	13	1

HISTORIC ARTIFACT TOTALS

	Parkway Gravel 7NC-G-100	Lorewood Grove	Dragon Run North B 7NC-G-104	Wrangle Hill South 7NC-G-105
CERAMICS				
Redware	2	--	--	1
Ironstone	14	--	--	--
Porcelain	1	2	--	--
Unidentified	--	1	--	--
GLASS				
Window	1	1	1	--
Bottle	20	--	--	--
Jar	2	--	--	--
ARCHITECTURAL				
Brick	--	--	--	1
MISCELLANEOUS				
Gunflint	1	--	--	--
TOTAL	41	4	1	2

	Conrail South A 7NC-E-93	Snapp Home	Stanley 7NC-E-97	Smith Parcel 15	Smith 7NC-E-98
CERAMICS					
Redware	1	--	--	5	6
Whiteware	--	--	--	13	10
Ironstone	--	1	1	--	--
Yellowware	--	--	--	1	--
Stoneware	--	1	--	1	1
GLASS					
Window	--	--	--	6	13
Bottle	1	3	23	1	23
Lamp	--	2	2	2	--
ARCHITECTURAL					
Brick	--	--	15	6	17
Nails					
Cut	--	1	--	--	1
Wire	--	--	--	1	--
Spike	--	--	--	--	1
Tile	--	--	--	--	3
MISCELLANEOUS					
Misc. Metal	--	--	2	--	10
Bone	--	--	--	1	2
Shell	--	1	--	--	--
Plastic	--	--	--	1	2
Carbon	--	--	--	11 gm	--
TOTAL	2	9	43	38+11 gm	89

	State of Delaware	Blaschko	Fairweather Parcel 23
CERAMIC			
Redware	1	6	--
Pearlware	--	1	--
Whiteware	--	7	1
GLASS			
Unidentified	--	68	--
ARCHITECTURAL			
Brick	--	1	--
Nails			
Cut	--	15	--
Wire	--	22	4
PERSONAL			
Buttons	--	10	--
MISCELLANEOUS			
Misc. Metal	--	5	--
TOTAL	1	135	5

APPENDIX II

SITE CATAGORIES

For the purpose of identifying the necessary levels of Phase II research at the varied archaeological sites and for categorizing significance, four major categories of sites were identified (Table 3 and Appendix II).

Category 1 consists of the largest sites with the highest potential for National Register eligibility. These sites may be several acres in size and contain undisturbed subsurface prehistoric features with associated artifacts. It is estimated that these sites will each require 8 weeks of fieldwork to complete the Phase II field testing program. Further work may not be necessary at the conclusion of the field testing program. However, it is more likely that these sites will require additional fieldwork or other mitigation measures. None of the archaeological sites identified during the Phase I survey fall into this category.

Category 2 consists of sites with a moderate potential for National Register eligibility. They are smaller in areal extent (generally but not exclusively less than an acre) and contain fewer diagnostic and total artifacts, although subsurface features may be present. A total of 5 prehistoric and 1 historic (N-5053) archaeological sites fall into the this category. These are sites 7NC-G-100, 7NC-G-101, 7NC-G-104, 7NC-E-93, 7NC-E-94, and 7NC-E-98 (N-5053). In the case of 7NC-G-104, the Dragon Run North B Site, the Category 2 designation is based upon the high integrity which characterizes that part of the site which is contained within an historically unplowed woodlot. It is estimated that these sites will each require 4 weeks of fieldwork to complete the Phase II testing program. Phase II fieldwork for

two of the prehistoric sites is being combined as one four week field testing program. At the end of the field testing program for the Category 2 archaeological sites, it is likely that no further work will be necessary. In some cases, the Phase II testing program may reveal significant archaeological remains which will merit further work.

Category 3 consists of sites with a very low potential significance for National Register eligibility due to low numbers of artifacts and questionnable contexts. Many of these are small lithic scatters and find spots. Three prehistoric sites fall within this category: 7NC-G-102, 7NC-G-103, and 7NC-G-105. Although the research plan (Custer, Bachman, and Grettler 1987:21) suggests that only a sample of these sites should be subjected to Phase II field testing, the small number of sites negates the need to apply the sampling technique mentioned above, and all three of the sites will be subjected to a Phase II testing program. It is estimated that three days of fieldwork per site is required to complete the Phase II testing program.

Category 4 consists of historic sites which appear to post-date 1850 based on initial Phase I archival research and artifact analysis. It is noted in the above mentioned research plan (Custer, Bachman, and Grettler 1987:21), that only a sample of the post-1850 historic sites need be subjected to Phase II testing and that this sample would be developed based on a knowledge of the age and function of these sites. Additional archival research would be undertaken for these sites. It is possible that the intensive archival research may reveal that

pre-1850 occupations exist at these sites. In that case, those sites would automatically require Phase II research and would not be part of the sampling process. No Category 4 archaeological sites were identified.

APPENDIX III

NOTES ON SITE NUMBERS

NOTES ON SITE NUMBERS
(an example)

7NC-G-100(N-12116)

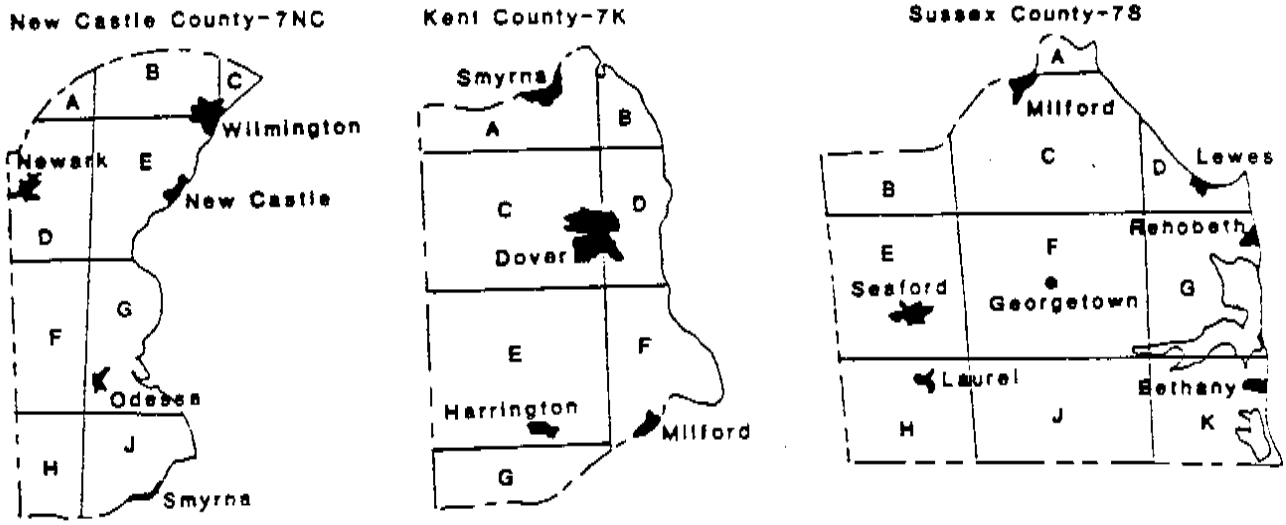
7NC-G-100

7NC-G-100	=	State Site Number
7	=	Numerical prefix identifying the state of Delaware.
NC	=	New Castle County; K = Kent County; S = Sussex County.
G	=	Each county is divided into lettered divisions called blocks; letter G indicates the block in which the site is found in New Castle County, Delaware. Note that there is no "I" block in any county due to confusion with Roman numeral I;
100	=	The 100th site recorded in block G, New Castle County Delaware.

N-12116

N-12116	=	Cultural Resource Survey (CRS) Number
N	=	New Castle County, Delaware; K = Kent County; S = Sussex County.
12116	=	The 12116th cultural resource inventoried in New Castle County. Each cultural resource number ties into the aerial photos and management files on repository with the Delaware Division of Historical and Cultural Affairs, Dover, Delaware and/or The Island Field Museum and Research Center, South Bowers, Delaware.

Block Map of 3 Counties of Delaware



APPENDIX IV

GLOSSARY

GLOSSARY

Aboriginal - Prehistoric peoples in North America.

Alluvium - Deposits of gravel, sand, and soil which are transported by flowing water.

Archaeology - The study of the people of the past through the recovery and analysis of the artifacts they left behind and their context.

Archival Research - Research done at places in which public or historical records, charters and documents are stored and preserved.

Artifact - Any object shaped or modified by man, or as a result of human activity.

Assemblage - The array of contemporary objects and associations found at an archaeological site.

Auger - A large tool for boring holes deep in the ground.

Basecamp - A prehistoric dwelling site for hunter-gatherers from which resource procurement forays are made.

Biface - A stone tool that has been flaked on both sides.

Bifurcate - A projectile point from the Archaic Period (6500 B.C.), it is a small point with a notched base.

Cache - A collection of artifacts and/or ecofacts which has been deliberately stored for future use.

Cobble - Frequent lithic tool resource for prehistoric peoples.

Core - A piece of stone from which other pieces of stone are flaked off to make artifacts.

Cortex - Weathered exterior of a piece of lithic material, may be either vein or water-worn cortex.

Cross-section - A transverse of a portion of a feature, horizontally and vertically removing soil from one section.

Cryptocrystalline - Indistinctly crystalline; having an indistinguishable crystalline structure. For example, chert and jasper.

Culture - The non-biological mechanism of human adaptation.

Debitage - Waste material from the manufacture of stone tools.

Deciduous - Leaf bearing trees that shed in autumn.

Detritus - Particles of rock or other material worn or broken away from a mass, as by the action of water or glacial ice; any disintegrated material; debris.

Diagnostic - Artifact with identifying traits that categorize the item to a specific time period.

Direct Percussion - Part of the lithic reduction process, a percussor is directly applied to the worked material with a sharp blow.

Extant - Still in existence.

Fallow Field - A plowed but not planted field.

Feature - Any soil disturbance or discoloration that reflects human activity, or an artifact that, being too large to remove from a site, normally is recorded only; for example, house, storage pits, etc. Can also be a very dense collection of artifacts; for example, a lithic chipping feature.

Field Reconnaissance - The walking of a field to examine the surface for any artifacts, architectural remains, or obvious archaeological features.

Flake - A piece of waste material from the manufacture of stone tools, caused by percussion or pressure applied to the object by an external agent (e.g. hammerstone, antler pressure flaker); flake itself may be further utilized as a tool (see "Debitage").

Hinterland - The land directly adjacent to and inland from a coast. Also a region remote from urban areas; back country.

Historic - The time period after the appearance of written records. In the New World, this generally refers to the time period after the beginning of European settlement at approximately 1600 A.D.

Holocene - The latest division of the Quarternary period, which commenced around 12,000 B.P.

Hundred - A subdivision of some English and American counties.

Hydrophytic - A type of plant that grows in and is adapted to an aquatic or very wet environment.

Indirect Percussion - In the lithic reduction process,a punch is held against the worked material and the punch is struck a sharp blow with a percussor.

In Situ - From the Latin, meaning "In the original place".

Intestate - A person who dies without making a will.

Interface - A surface regarded as the common boundary of two bodies or spaces.

Lithic - Pertaining to or consisting of stone.

Loam - A loose soil composed of roughly equal parts of silt, clay, and sand, especially a kind containing organic matter and of great fertility.

Locus - A defined archaeological site or testing location.

Macro-band Base Camp - For a hunter-gatherer society, an archaeological site one hectare (2.5 acres) or larger in area characterized by a wide variety of tool types, abundant ceramics, semi-subterranean house structures, storage pit features, and abundant debitage from tool manufacture and reduction.

Mean Ceramic Date - A date obtained from the study of historic ceramics recovered from a site that approximates the median occupation date of the site.

Mega Fauna - A number of species of presently extinct mammals including mammoths and mastodons.

Mesic - A vegetation pattern characterized by relatively wet-adapted plant species, such as oak and hemlock forests.

Micro-band Base Camp - A component of a macro-band base camp, perhaps one or two extended families, which periodically operates independently of the macro-band group.

Midden - A refuse heap.

Mitigate - To make the effects of a public works project on an archaeological site less severe or intense by excavating it, preserving it in place, or by moving the Proposed Right-of-Way.

Orphans Court Records - The County Court responsible for the welfare of orphans when a father died without a will. Orphans Court watched over the estate until the children (if any) reached majority. A guardian was appointed by the Court, who was to make periodic returns of the estate to the Court. When the youngest heir came of age, the property could be divided among the heirs. These court records are filled with information regarding income, personal property, education, repairs of houses and outbuildings, contracts, and other useful material about eighteenth and nineteenth century life.

Pedestrian Survey - The walking and collecting of an archaeological site without the excavation of subsurface units. Also known as surface collection.

Pleistocene - A division of the geologic Quarternary Period, which began around 2.3 to 3 million years ago and is associated with rapid hominid evolution from Australopethicinae to Homo sapiens sapiens.

Plowzone - In a plowed field, the upper layer of organic soil which is continually reworked by the plow. In the Middle Atlantic region this is about 8-12 inches.

Posthole - A hole dug in the ground into which a post is placed.

Postmold - The organic stain in the ground which is left by a decayed wooden post. A postmold stain may occur inside of a posthole stain on an archaeological site.

Prehistoric - The time period before the appearance of written records. In the New World this generally refers to indigenous, pre-Contact societies.

Probate - The official proving of a will as authentic or valid.

Procurement Site - A place that is visited because there is a particular item to acquire; i.e., lithic outcrops.

Profile - A side view of a feature or test unit.

Projectile Point - Strictly speaking, a biface attached to the head of an airborne item of weaponry, like an arrow or a thrown dart; frequently used indiscriminately when referring to any biface.

Sherd - A piece of broken pottery.

Slag - The byproduct of the incomplete combustion of coal, particularly soft coal. Commonly known as "clinkers".

Soil Horizon - Soils are divided into 3 horizons,whichreflect different kinds of chemical and physical processes that have resulted from changing climatic conditions.

Staging Site - A temporary camp where preparations are made for another operation such as a hunting foray.

Stratigraphy - The examination of the soil layering on an archaeological site; the characteristics of each individual stratum and its relationship to others in the sequence is critical to understanding the temporal and spatial characteristics of the site.

Strata - The various layers of human or geological origin which comprise archaeological sites.

Subsoil - Sterile, naturally occurring soils not changed by human occupation.

Subsurface - Below the surface, not visible from the surface.

Surface Collection - Act of walking along a surface such as an open field or plowed field, and collecting artifacts seen on the surface of the ground. Also known as pedestrian survey.

Tool Kit - A collection of artifacts from a sealed context within a site interpreted as being designed for a specific function.

Uniface - A stone tool that has been flaked only on one side.